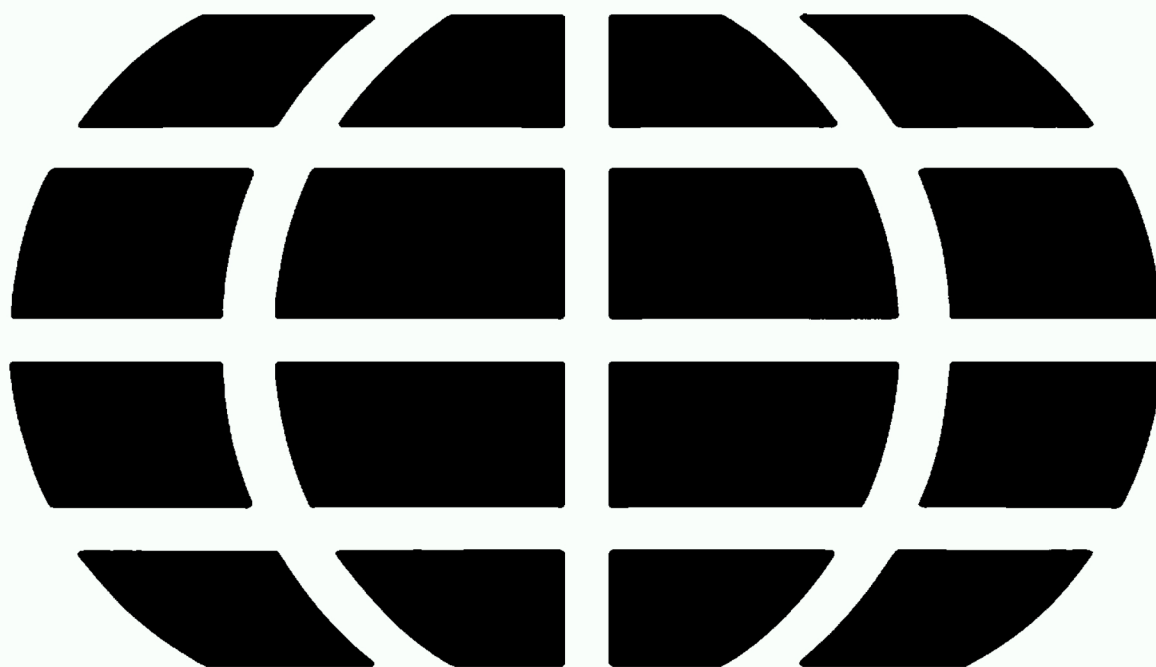

1990

GEO



• **METRO** •

SERVICE MANUAL SUPPLEMENT

Covering the Metro Convertible Model

CAUTION

To reduce the chance of personal injury and/or property damage, the following instructions must be carefully observed:

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of all motor vehicles. If part replacement is necessary, the part must be replaced with one of the same part number or with an equivalent part. Do not use a replacement part of lesser quality.

The service procedures recommended and described in this service manual are effective methods of performing service and repair. Some of these procedures require the use of tools specially designed for the purpose.

Accordingly, anyone who intends to use a replacement part, service procedure or tool, which is not recommended by the vehicle manufacturer, must first determine that neither his safety nor the safe operation of the vehicle will be jeopardized by the replacement part, service procedure or tool selected.

It is important to note that this manual contains various 'Cautions' and 'Notices' that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these 'Cautions' and 'Notices' are not exhaustive, because it is impossible to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

1990 Geo METRO SERVICE MANUAL SUPPLEMENT

Covering the Metro Convertible Model

FOREWORD

This manual has been prepared as a supplement to the 1990 Geo Metro Service Manual (ST370-90). Use this supplement in all cases when a service question arises regarding the Metro Convertible model.

An understanding of the material contained in this manual and in the appropriate Dealer Service Bulletins will help technicians to better service vehicle owners.

When reference is made in this manual to a brand name, number, or specific tool, an equivalent product may be used in place of the recommended item.

All information, illustrations, and specifications contained in this literature are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above conditions are not followed, parts or system damage could result.

CHEVROLET-PONTIAC-CANADA GROUP
General Motors Corporation
WARREN, MICHIGAN

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ST370-90SUPP

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1990 SERVICE MANUAL COMMENT FORM

Use this form to advise us of any errors you might find in this manual. We also welcome suggestions for improving this Service Manual.

Service Manual(s) that have the error _____

Page number(s) that have the error _____

Figure number(s) that have the error _____

VIN (if available) or model and applicable options _____

Describe in detail, the error found or the suggestion(s). Attach additional pages if necessary.

[illegible]

From: Dealer Firm Name _____ Dealer Code _____
City/Town _____ State _____
Name of Person Submitting This Comment Form _____
Signature _____ Date _____

Mail To: Customer Satisfaction
G-30-5
C.C.O.B.
30007 Van Dyke Ave.
Warren, MI. 48090

SECTION 0A

GENERAL INFORMATION

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above conditions are not followed, parts or system damage could result.

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SUPPLEMENTAL INFLATABLE RESTRAINT

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in Section 9J under ON-VEHICLE SERVICE before performing service on or around SIR components or SIR wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

SIR equipped vehicles can be identified by:

- Steering wheel hub marked as "SIR."
- "INFLATABLE RESTRAINT" warning lamp in the instrument panel cluster.
- A code "3" for the seventh digit of the vehicle identification number.

HANDLING ELECTROSTATIC DISCHARGE (ESD) SENSITIVE PARTS

Figure 1

NOTICE: When handling an electric part that has an ESD sensitive sticker, the service technician should follow these guidelines to reduce any possible electrostatic charge buildup on the service technician's body.

1. Do not open package until it is time to install the part.
2. Avoid touching electrical terminals of the part.
3. Before removing the part from its package, ground the package to a known good ground on the vehicle.
4. Always touch a known good ground before handling the part. This should be repeated while

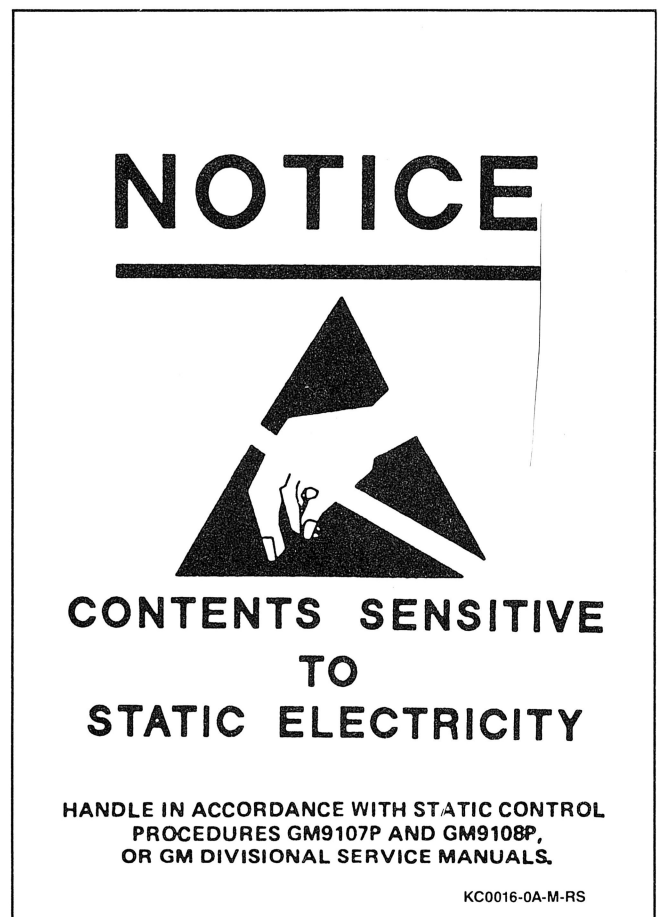


Figure 1 Electrostatic Discharge Sensitive Parts Label

handling the part and more frequently after sliding across the seat, sitting down from a standing position or walking a distance.

BODY IDENTIFICATION

The body number plate identifies the identification numbers and model year, build date code, vehicle division, series, style, body assembly plant, plant number, paint color codes, type of paint, trim combination, modular seat code and roof option. The I.D. plate is located on the cowl top panel.

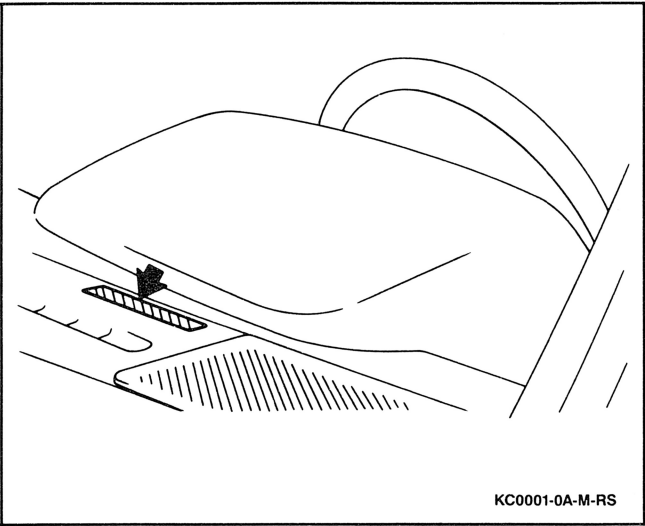


Figure 2 Vehicle Identification Number Location

VEHICLE IDENTIFICATION NUMBER

Figures 2 and 3

The Vehicle Identification Number (VIN) is located on the left upper corner of the instrument panel. The sequential unit number is prefixed by letters and numbers which are explained in Figure 3.

ENGINE IDENTIFICATION

Figure 4

The stick-on labels attached to the engine, or laser etching or stampings of the engine block, indicate the engine unit number or date code. All engines and transaxles are stamped with a partial VIN. The stamping contains nine positions. Refer to Figure 4 for details.

JG1

M

R

3

3

6



L

K

700001

SEQUENTIAL NUMBER

ASSEMBLY PLANT (K= KOSAI, JAPAN)

MODEL YEAR ("K" = 1989, "L" = 1990, "M" = 1991, "N" = 1992)

CHECK DIGIT

ENGINE TYPE 6 = G10)

RESTRAINT TYPE (3 = MANUAL BELT AND BUILT-IN SAFETY)

BODY STYLE (3 = CONVERTIBLE)

SERIES (R = METRO, SPRINT OR FIREFLY)

CAR LINE

WORLD MANUFACTURER IDENTIFIER (JG1 = CHEVROLET, JG2 = PONTIAC)

VEHICLE IDENTIFICATION NUMBER

LC0015-0A-MC-RS

Figure 3 Vehicle Identification Number

TRANSAXLE IDENTIFICATION

Figure 5

Refer to Figure 5 for transaxle identification number location and determination.

GENERAL VEHICLE LIFTING AND JACKING

Figures 6 and 7

On front wheel drive vehicles, the centerline-of-gravity is further forward than on rear-wheel drive vehicles. Therefore, **whenever removing major components from the rear** of the vehicle, while supported on a hoist, it is **mandatory** to support the vehicle in a manner to prevent the possibility of the vehicle tipping forward.

CAUTION: Failure to follow the procedures outlined may result in unsatisfactory vehicle performance, or a durability failure which may result in loss of control of the vehicle. Lifting should only be done at the positions indicated to prevent possible damage to the vehicle. If the vehicle is to be lifted up only at the front or rear end, be sure to block the wheels in order to ensure safety. After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on the vehicle raised on a jack alone.

METRIC FASTENERS

Figures 8 and 9

This vehicle is primarily dimensioned in the metric system. Most fasteners are metric and are close in dimension to the well-known customary fasteners in the English system. It is important that replacement fasteners be of the correct nominal diameter, thread pitch and strength.

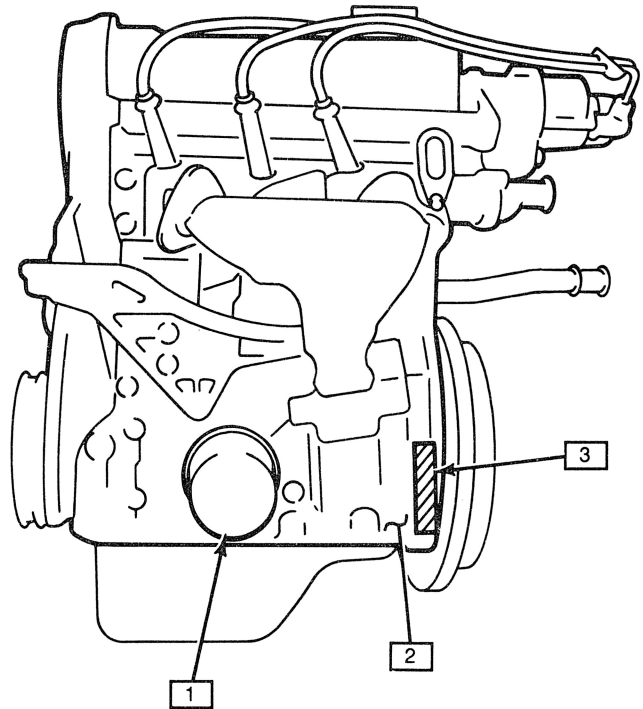
Original equipment metric fasteners (except "beauty" bolts, those bolts exposed on bumpers and cross-recess head screws) are identified by a number

ENGINE IDENTIFICATION NUMBER LOCATION

G 10 L 510001

- SEQUENTIAL NUMBER
- MODEL YEAR
(REFER TO VIN DESIGNATION)
- ENGINE DISPLACEMENT
("10" = 1.0 LITER)
- ENGINE TYPE

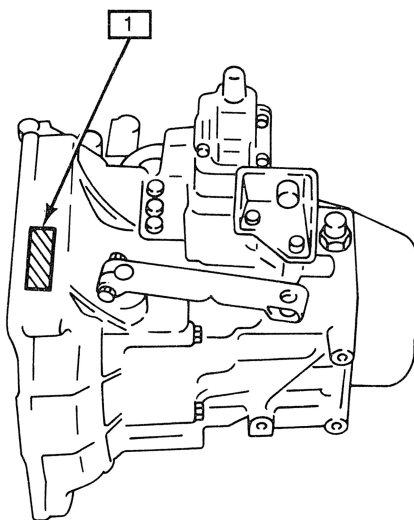
- 1** OIL FILTER
- 2** CYLINDER BLOCK
- 3** ENGINE IDENTIFICATION NUMBER



LC0016-0A-MC-RS

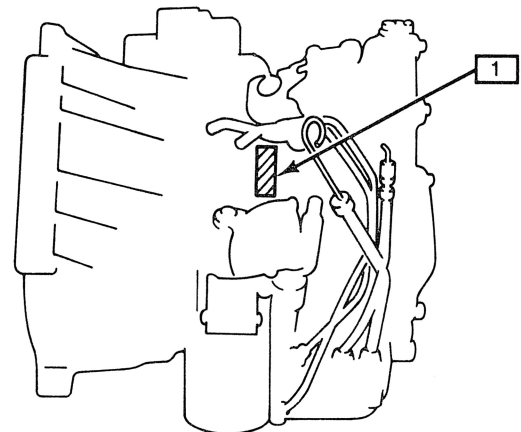
Figure 4 Engine Identification Number Location

TRANSAXLE IDENTIFICATION NUMBER LOCATION



MANUAL TRANSAXLE

- L 100001** — (M/T)
- L 700001** — (A/T)
- Serial Number
- Model Year (Refer to VIN Designation)



AUTOMATIC TRANSAXLE

- 1** TRANSAXLE IDENTIFICATION NUMBER

LC0017-0A-MC-RS

Figure 5 Transaxle Identification Number Location

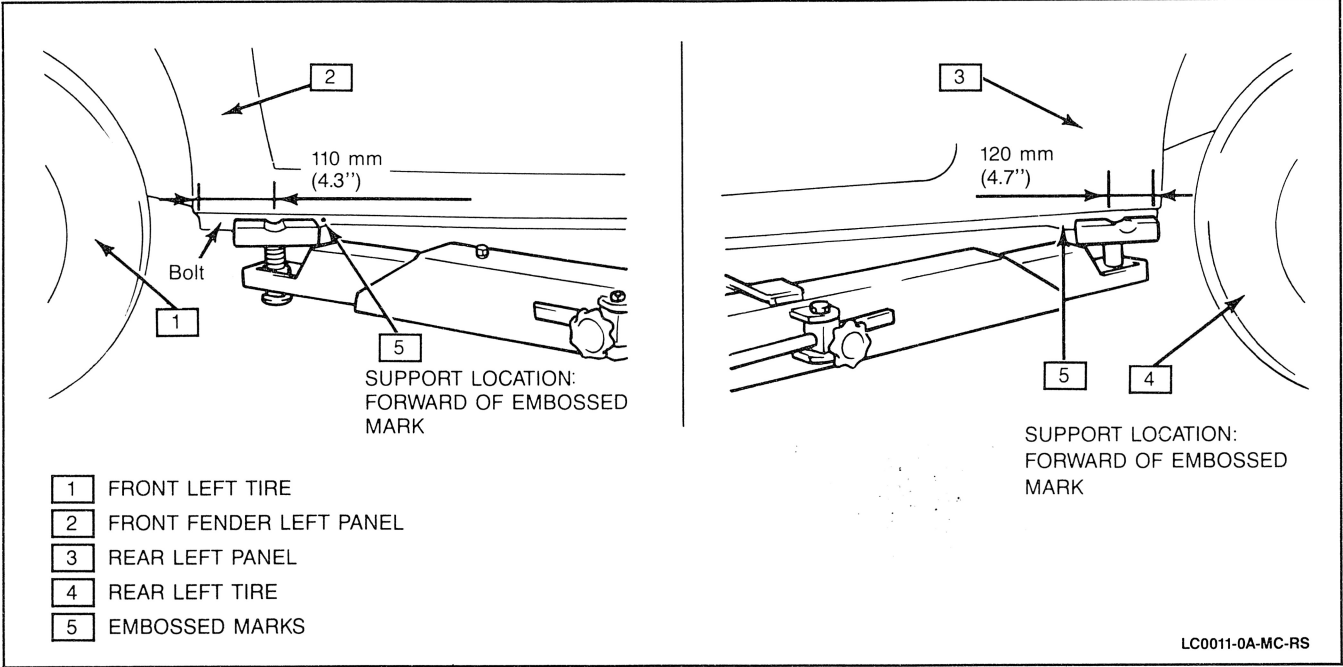


Figure 6 Frame Contact Hoist Support Locations

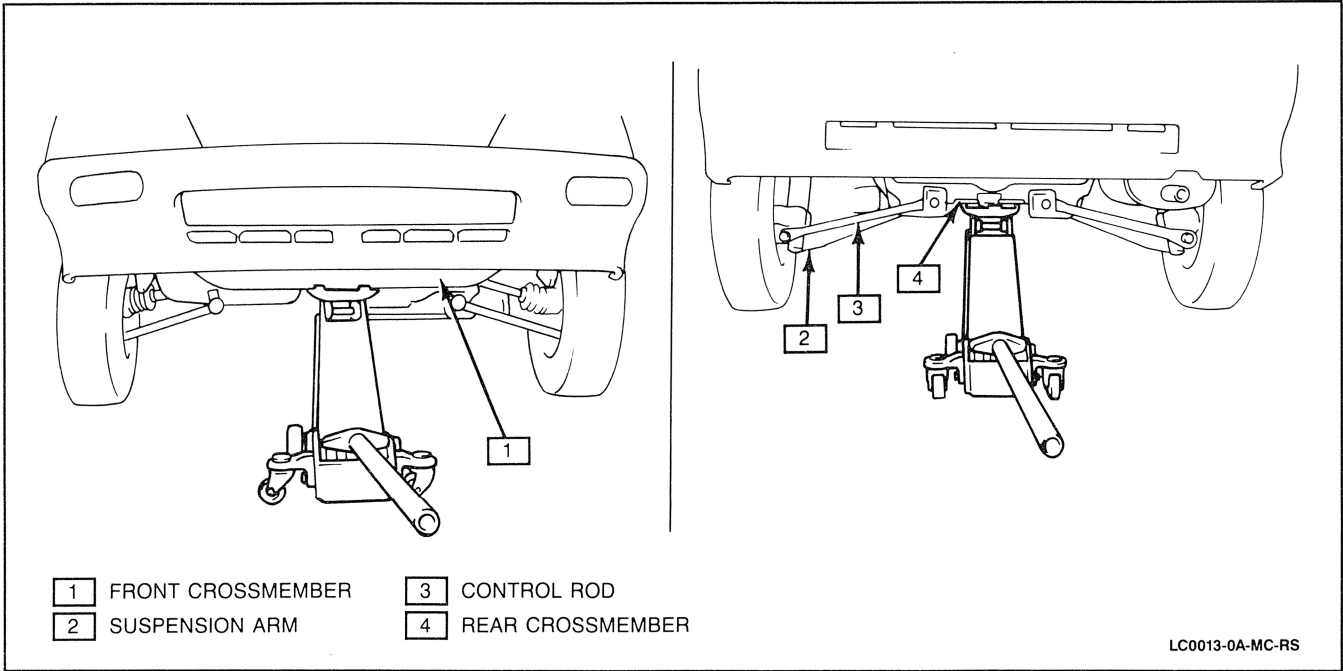


Figure 7 Floor Jack Support Locations

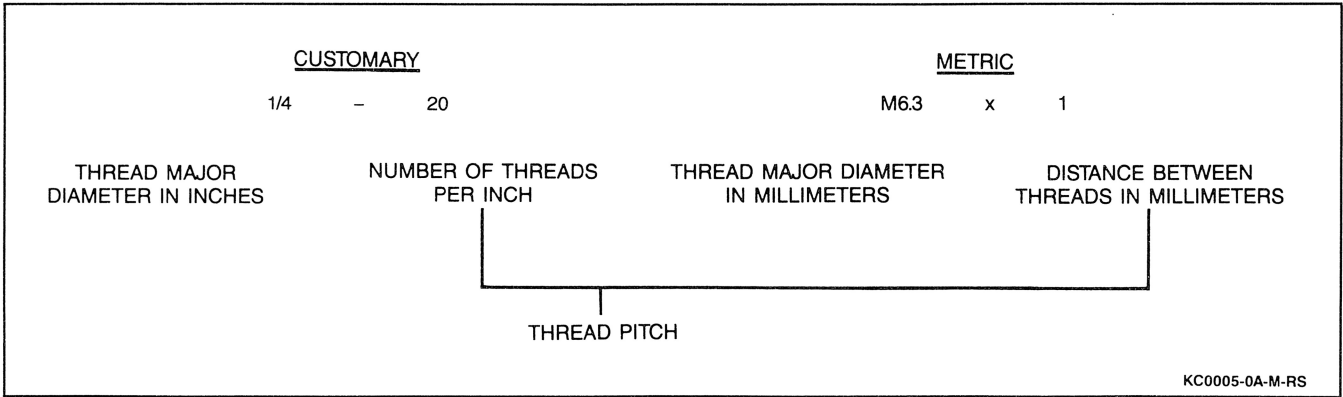


Figure 8 Thread Notation

METRIC COARSE SCREW THREADS				METRIC FINE SCREW THREADS			
Designa- tion of screw thread	Pitch (mm)	Designa- tion of screw thread	Pitch (mm)	Designa- tion of screw thread	Pitch (mm)	Designa- tion of screw thread	Pitch (mm)
M1.6	0.35	M12	1.75			M12x1.25	1.25
M2	0.4	M14	2			M14x1.5	1.5
M2.2	0.45	M16	2			M16x1.5	1.5
M2.5	0.45	M18	2.5			M18x1.5	1.5
M3x0.5	0.5	M20	2.5			M20x1.5	1.5
M3.5	0.6	M22	2.5			M22x1.5	1.5
M4x0.7	0.7	M24	3			M24x2	2
M4.5	0.75	M27	3			M27x2	2
M5x0.8	0.8	M30	3.5			M30x2	2
M6	1	M33	3.5			M33x2	2
M7	1	M36	4			M36x3	3
M8	1.25	M39	4	M8x1	1	M39x3	3
M10	1.5			M10x1.25	1.25		

KC0004-0A-M-RS

Figure 9 Metric Screw Table

marking which indicates the strength of the material in the fastener.

General Motors Engineering Standards, along with other North American Industries, has adopted a portion of the standard metric fastener sizes defined by ISO (International Standards Organization). This was done to reduce the number of fastener sizes used and yet retain the best strength qualities in each thread size. For example, the customary 1/4-20 and 1/4-28 screws are replaced by the metric M6.0 X1 screw which has nearly the same diameter and 25.4 threads per inch. The thread pitch is in between the customary coarse and fine thread pitches. Metric and customary thread notation differ slightly. Refer to Figure 8.

FASTENER STRENGTH IDENTIFICATION

Figure 10

Most commonly used metric fastener strength property classes are 4T, 7T and radial line with the class identification embossed on the head of each bolt. Some metric nuts will be marked with punch mark strength identification on the nut face.

When replacing metric fasteners, be careful to use bolts and nuts of the same strength or greater than the original fasteners (the same number marking or higher). It is likewise important to select replacement fasteners of the correct size.

Correct replacement bolts and nuts are available through the parts division. Many metric fasteners available in the aftermarket parts channels were designed to metric standards of countries other than the United States, and may be of lower strength, may not have the same numbered head marking system and may be of a different thread pitch.

The metric fasteners used on GM products are not designed to new, international standards that may not yet be manufactured by some nondomestic bolt and nut suppliers. In general, except for special applications, the common sizes and pitches are shown in Figure 10.

NOTICE: The designations of the standard fasteners used on this vehicle are of coarse screw thread up to M8 and fine screw thread beyond M10. As it is shown in Figure 9, the designation to pitch relations are somewhat different between coarse screw thread and fine screw thread. Therefore, when replacing fasteners, the pitch should be confirmed carefully even if the replacement fastener is the same metric fastener.

PREVAILING TORQUE FASTENERS

Figures 11 and 17

A prevailing torque nut is designed to develop an interference between the nut and bolt threads. This is most often accomplished by distortion of the top of an all metal nut or by using a nylon patch on the threads in the middle of the hex flat. A nylon insert may also be used as a method of interference between nut and bolt threads.

A prevailing torque bolt is designed to develop an interference between bolt and thread nuts, or the threads of a tapped hole. This is accomplished by distorting some of the threads or by using a nylon patch or adhesive.

Recommendations for Reuse

- Clean, unruined prevailing torque nuts and bolts may be reused as follows:
 1. Clean dirt and other foreign material off nuts or bolts.
 2. Inspect nuts or bolts to ensure there are no cracks, elongation or other signs of abuse or overtightening. (If there is any doubt, replace with a new prevailing torque fastener of equal or greater strength.)
 3. Assemble parts and hand start nuts or bolts.
 4. Observe that before fastener seats, it develops torque per the chart in Figure 12. (If there is any doubt, replace it with a new prevailing torque fastener of equal or greater strength.)
 5. Tighten fastener to torque specified in the appropriate section of this manual.
- Bolts and nuts which are rusty or damaged should be replaced with new parts of equal or greater strength.

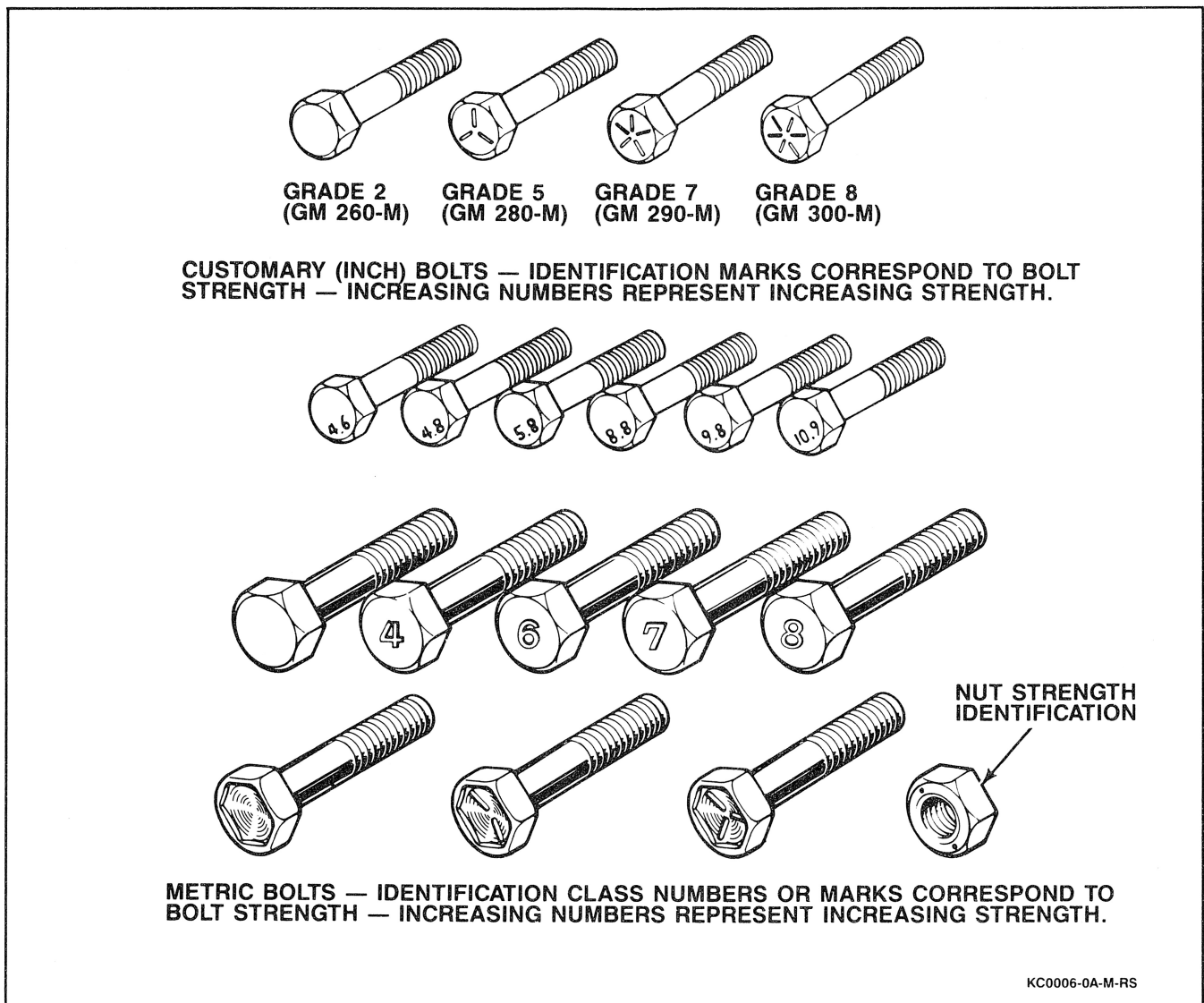


Figure 10 Bolt Strength Markings

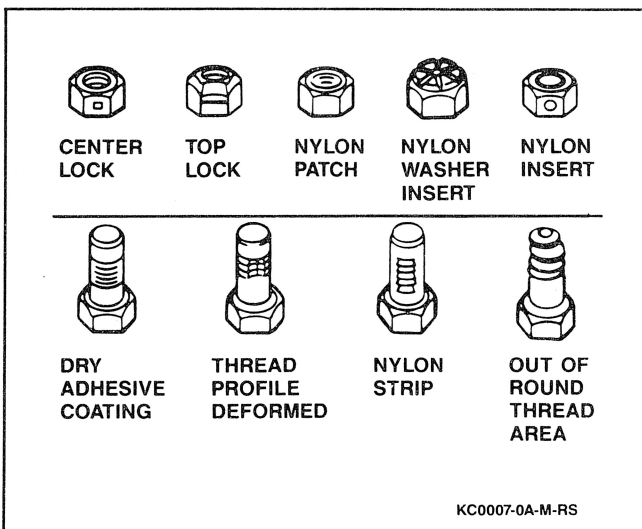
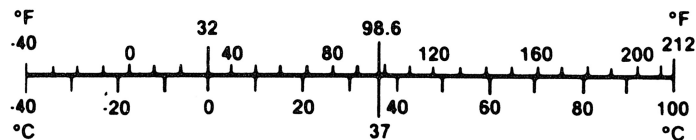


Figure 11 Prevailing Torque Fasteners

SI METRIC-CUSTOMARY CONVERSION TABLE

Multiply	by	to get equivalent number of:
LENGTH		
Inch	25.4	millimeters (mm)
Foot	0.304	meters (m)
Yard	0.914	meters
Mile	1.609	kilometers (km)
AREA		
Inch ²	645.2	millimeters ² (mm ²)
	6.45	centimeters ² (cm ²)
Foot ²	0.092	meters ² (m ²)
Yard ²	0.836	meters ²
VOLUME		
Inch ³	16 387.	mm ³
	16.387	cm ³
	0.016	liters (l)
Quart	0.946	liters
Gallon	3.785	liters
Yard ³	0.764	meters ³ (m ³)
MASS		
Pound	0.453	kilograms (kg)
Ton	907.18	kilograms (kg)
Ton	0.907	tonne (t)
FORCE		
Kilogram	9.807	newtons (N)
Ounce	0.278	newtons
Pound	4.448	newtons
TEMPERATURE		
Degree Fahrenheit	(°F-32) ÷ 1.8	degree Celsius (C)



Multiply	by	to get equivalent number of:
ACCELERATION		
Foot/sec ²	0.304	meter/sec ² (m/s ²)
Inch/sec ²	0.025	meter/sec ²
TORQUE		
Pound-inch	0.112	newton-meters (N·m)
Pound-foot	1.355	newton-meters
POWER		
Horsepower	0.746	kilowatts (kW)
PRESSURE OR STRESS		
Inches of mercury	3.377	kilopascals (kPa)
Pounds/sq. in.	6.895	kilopascals
ENERGY OR WORK		
BTU	1 055.	joules (J)
Foot-pound	1.355	joules
Kilowatt-hour	3 600 000. or 3.6x10 ⁶	joules (J = one W's)
LIGHT		
Foot candle	10.764	lumens/meter ² (lm/m ²)
FUEL PERFORMANCE		
Miles/gal	0.425	kilometers/liter (km/l)
Gal/mile	2.352	liters/kilometer (l/km)
VELOCITY		
Miles/hour	1.609	kilometer/hr. (km/h)

Figure 12 Metric English Conversion Table

J20025-0A-1

DECIMAL AND METRIC EQUIVALENTS

Fractions	Decimal In.	Metric MM.	Fractions	Decimal In.	Metric MM.
1/64	.015625	.39688	33/64	.515625	13.09687
1/32	.03125	.79375	17/32	.53125	13.49375
3/64	.046875	1.19062	35/64	.546875	13.89062
1/16	.0625	1.58750	9/16	.5625	14.28750
5/64	.078125	1.98437	37/64	.578125	14.68437
3/32	.09375	2.38125	19/32	.59375	15.08125
7/64	.109375	2.77812	39/64	.609375	15.47812
1/8	.125	3.1750	5/8	.625	15.87500
9/64	.140625	3.57187	41/64	.640625	16.27187
5/32	.15625	3.96875	21/32	.65625	16.66875
11/64	.171875	4.36562	43/64	.671875	17.06562
3/16	.1875	4.76250	11/16	.6875	17.46250
13/64	.203125	5.15937	45/64	.703125	17.85937
7/32	.21875	5.55625	23/32	.71875	18.25625
15/64	.234375	5.95312	47/64	.734375	18.65312
1/4	.250	6.35000	3/4	.750	19.05000
17/64	.265625	6.74687	49/64	.765625	19.44687
9/32	.28125	7.14375	25/32	.78125	19.84375
19/64	.296875	7.54062	51/64	.796875	20.24062
5/16	.3125	7.93750	13/16	.8125	20.63750
21/64	.328125	8.33437	53/64	.828125	21.03437
11/32	.34375	8.73125	27/32	.84375	21.43125
23/64	.359375	9.12812	55/64	.859375	21.82812
3/8	.375	9.52500	7/8	.875	22.22500
25/64	.390625	9.92187	57/64	.890625	22.62187
13/32	.40625	10.31875	29/32	.90625	23.01875
27/64	.421875	10.71562	59/64	.921875	23.41562
7/16	.4375	11.11250	15/16	.9375	23.81250
29/64	.453125	11.50937	61/64	.953125	24.20937
15/32	.46875	11.90625	31/32	.96875	24.60625
31/64	.484375	12.30312	63/64	.984375	25.00312
1/2	.500	12.70000	1	1.00	25.40000

520014-0A

Figure 13 Decimal and Metric Equivalents

LIST OF AUTOMOTIVE ABBREVIATIONS WHICH MAY BE USED IN THIS MANUAL

A		cg	center of gravity
A-6	Axial 6 Cylinder A/C Compressor	CHA	Carburetor Hot Air
A/C	Air Conditioning	CID	Cubic Inch Displacement
A/F	Air/Fuel (A/F Ratio)	CLCC	Closed Loop Carburetor Control
ABDC	After Bottom Dead Center	CLTBI	Closed Loop Throttle Body Injection
ABS	Acrylonitrile-Butadiene-Styrene	cm ³	cubic centimeter
ABS	Antilock Brake System	CO	carbon monoxide
AC	Alternating Current (Also a GM Division)	COA	Carburetor Outside Air
ACC	Automatic Climate Control	CP	Canister Purge
ADF	Air Deflector Valve	CPS	Central Power Supply
AIR	Air Injection Reaction	CPU	Central Processing Unit
Al	aluminum	CTS	Coolant Temperature Sensor, Coolant Temperature Switch, Cold Trapped Spark
ALC	Automatic Level Control		
ALCL	Assembly Line Communication Link	cu ft or ft ³	cubic foot (feet)
ALDL	Assembly Line Diagnostic Link	cu in or in ³	cubic inch (inches)
AM/FM	Amplitude Modulation, Frequency Modulation	CV	constant velocity
amp	amperes	D	
API-GL	American Petroleum Institute Gear Lubricant	dB	decibels
APS	Absolute Pressure Sensor	dBA	decibels on A-weighted scale
APT	Adjustable Part Throttle	DBB	Dual Bed Bead
ARS	Automatic Restraint System	DBM	Dual Bed Monolith
ATC	Automatic Temperature Control	DC	Direct Current
ATDC	After Top Dead Center	DEC	Digital Electronic Controller
ATS	Air Temperature Sensor	DEFI	Digital Electronic Fuel Injection
avg	average	DERM	Diagnostic/Energy Reserve Module
AWD	All Wheel Drive	DFI	Digital Fuel Injection
AWG	American Wire Gage	dia	diameter
		DIS	Direct Ignition System
B		DVM	Digital Volt Meter
BARO	Barometric Absolute Pressor Sensor	E	
BBDC	Before Bottom Dead Center	EAC	Electronic Air Control
BCM	Body Computer Module	EAS	Electric Air Switching
BHP	Brake Horsepower	EBCM	Electric Brake Control Module
BP	Back Pressure	ECC	Electronic Comfort Control, Electronic Climate Control
BTDC	Before Top Dead Center		
BtU	British thermal unit	ECI	Extended Compression at Idle
C		ECM	Electronic (Engine) Control Module
C	Celsius	ECS	Emission Control System
C LOOP	Closed Loop	ECU	Engine Calibration Unit
C-4	Computer Controlled Catalytic Converter	EDES	Electric Divert Electric Air Switching Valve
C3I, 3C1	Computer Controlled Coil Ignition	EEC	Evaporative Emission Control
CAD	Computer Aided Design	EECS	Evaporative Emissions Control System
CAM	Computer Aided Manufacturing	EES	Evaporative Emission System
CCC, 3-C	Computer Command Control	EFE	Early Fuel Evaporation
CCOT	Cycling Clutch Orifice Tube	EFI	Electronic Fuel Injection
CCP	Controlled Canister Purge cad	EGR	Exhaust Gas Recirculation
Cd	cadmium	ELC	Electronic Level Control
CDRV	Crankcase Depression Regulator Valve	EMF	Electromotive Force
CEAB	Cold Engine Airbleed	EOS	Exhaust Oxygen Sensor
CEMF	Counter Electromotive Force	EPR	Exhaust Pressure Sensor
cfm	cubic feet per minute	EPROM	Erasable Programmable Read Only Memory

ESC	Electronic Spark Control	L-4	Four Cylinder, In-Line Engine
EST	Electronic Spark Timing	L-6	Six Cylinder, In-Line Engine
ETC	Electronic Temperature Control	lb. ft.	pound feet (torque)
ETCC	Electronic Touch Comfort Control	lb. in.	pound inch (torque)
ETR	Electronic Touch Climate Control	LCD	Liquid Crystal Display
EVRV	Electronic Vacuum Regulator Valve	LF	Left Front
F		LH	Left Hand
F	Fahrenheit	LR	Left Rear
FDC	Fuel Data Center	M	
FEC	Fuel Evaporator Control	M/C	Mixture Control
FED	Federal (all states except California)	MAF	Mass Airflow
FI	Fuel Injection	MAP	Manifold Absolute Pressure Sensor
FICD	Fast Idle Control Diaphragm	MAT	Manifold Air Temperature Sensor
ft	foot	MDP	Manifold Differential Pressure
FWD	Front Wheel Drive, Four Wheel Drive	MEM-CAL	Memory and Calibration Unit
G		MFI	Multi-port Fuel Injection
g	gravitational acceleration	mgd	million gallons per day
GA	gage	mi	miles
gal	gallon	mm	millimeters
GM	General Motors	MPFI	Multi Port Fuel Injection
GCW	Gross Combination Weight	mpg	miles per gallon
H		mph	miles per hour
H ₂ O	water	ms	millisecond
H/CMPR	High Compression	MT	Manual Transmission
HC	hydrocarbons	MV	megavolt
HD	Heavy Duty	mV	multivolt
HDC	Heavy Duty Cooling	MVS	Metering Valve Sensor
HEI	High Energy Ignition	N	
hex	hexagon	N·m	Newton-meters (torque)
Hg	mercury	NC	Normally Closed
HI ALT	High Altitude	NEU	neutral
HIC	High Idle Compensator	Ni	nickel
hP	horsepower	NLGI	National Lubricating Grease Institute
HPCA	Housing Pressure Cold Advance	NO	Normally Open
HPL	High Pressure Liquid	No	oxides of nitrogen
HPV	High Pressure Vapor	NPTC	National Pipe Thread Coarse
HVAC	Heater-Vent-Air Conditioning	NPTF	National Pipe Thread Fine
Hz	hertz	O	
I		O ₂	oxygen
IAC	Idle Air Control	OC	Oxidizing Converter
IC	Integrated Circuit	OD	Outside Diameter
ID	Insider Diameter	OEM	Original Equipment Manufacturer
ILC	Idle Load Compensator	ORC	Oxidizing Reducer Converter
IP	Instrument Panel	oz	ounce(s)
ISC	Idle Speed Control	P	
J		P/N	Park/Neutral
K		PAIR	Pulse Air Injection Reaction
kg	kilogram	PCV	Positive Crankcase Ventilation
kHz	kilohertz	PECV	Power Enrichment Control Valve
km/h	kilometers per hour	PEDES	Pressure Operated Electric Divert
km/l	kilometers per liter		Electric Switching Valve
kPa	KiloPascals	PFI	Port Fuel Injection
kv	kilovolts	POA	Pilot Operated Absolute Valve
L		POLYE	polyethylene
L	liter	POLYF	polyfoam
		POLYP	polypropylene

LC0047-0A-R-RS

Figure 15 Abbreviation Chart (2 of 3)

POLYU	polyurethane	TCCTVMV	Torque Converter Clutch Trim Vacuum Modulated Valve
ppm	parts per million	TDC	Top Dead Center
PROM	Programmable Read Only Memory	TH	Turbo Hydra-matic
PS	Power Steering	THERMAC	Thermostatic Air Cleaner
psi	pounds per square inch	TPE	Thermo Plastic Elastomer
psia	pounds per square inch absolute	TPI	Tuned Port Injection
psig	pounds per square inch gage	TPO	Thermo Plastic Olefin
pt	pint(s)	TPS	Throttle Position Sensor, Throttle Position Switch
PTO	Power Take Off	TRC	Throttle Return Control
PWM	Pulse Width Modulated	TV	Throttle Valve
Q		TVBV	Turbocharger Vacuum Bleed Valve
qt	quart(s)	TVRS	Television and Radio Suppression
R		TVS	Thermal Vacuum Switch
R-4	Radial Four Cylinder Air Compressor	TXV	Thermal Expansion Valve
R-12	Refrigerant-12	U	
RAM	Random Access Memory	U-joint	universal joint
RAP	Retained Access Power	V	
RF	Right Front	v	volt(s), voltage
RFI	Radio Frequency Interference	V4	Four Cylinder Engine
RH	Right Hand	V6	Six Cylinder Engine
RIM	Reaction Injection Molded Urethane	V8	Eight Cylinder Engine
rpm	revolutions per minute	VAC	vacuum
RPO	Regular Production Option	VATS	Vehicle Anti-Theft System
RR	Right Rear	VDV	Vacuum Delay Valve
RRIM	Reinforced Reaction Injected Molded Urethane	vel	velocity
RT	right	VF	Vacuum Fluorescent
RTV	Room Temperature Vulcanizing	VIN	Vehicle Identification Number
RVB	Rear Vacuum Brake	VLV	Vacuum Limiting Valve
RVR	Response Vacuum Reducer	VLVMV	Vacuum Limiting Vacuum Modulator Valve
RWD	Rear Wheel Drive	VMV	Vacuum Modulator Valve
S		VRV	Vacuum Reducer Valve
SAE	Society of Automotive Engineers	VSS	Vehicle Speed Sensor
SEO	Special Equipment Option	W	
SES	Service Engine Soon	W/S	Windshield
SI	System International	WOT	Wide Open Throttle
Si	Silicone	WSS	Wheel Speed Sensor
SIR	Supplemental Inflatable Restraint System	X	
SMC	Sheet Molded Compound	X-valve	expansion valve
SO ₂	sulfur dioxide	Y	
sq. ft., ft ²	square foot (feet)	yd	yard(s)
sq. in., in ²	square inch (es)	Z	
T		Zn	zinc
TAC	Thermostatic Air Cleaner		
TBI	Throttle Body Injection		
TCC	Torque Converter Clutch, Transmission Converter Clutch		

Figure 16 Abbreviation Chart (3 of 3)

0A-12 GENERAL INFORMATION

METRIC SIZES									
		6 & 6.3	8	10	12	14	16	20	
NUTS AND ALL METAL BOLTS	N·m	0.4	0.8	1.4	2.2	3.0	4.2	7.0	
	In. Lbs.	4.0	7.0	12	18	25	35	57	
ADHESIVE OR NYLON COATED BOLTS	N·m	0.4	0.6	1.2	1.6	2.4	3.4	5.6	
	In. Lbs.	4.0	5.0	10	14	20	28	46	
INCH SIZES									
		.250	.312	.375	.437	.500	.562	.625	.750
NUTS AND ALL METAL BOLTS	N·m	0.4	0.6	1.4	1.8	2.4	3.2	4.2	6.2
	In. Lbs.	4.0	5.0	12	15	20	27	35	51
ADHESIVE OR NYLON COATED BOLTS	N·m	0.4	0.6	1.0	1.4	1.8	2.6	3.4	5.2
	In. Lbs.	4.0	5.0	9.0	12	15	22	28	43

KC0008-0A-M-RS

Figure 17 Torque Chart

SERVICE PARTS IDENTIFICATION LABEL

The Service Parts Identification Label provides identification of vehicle equipment to assist in servicing and determining replacement parts. Included on this label will be regular production options (RPO's) as well as standard and mandatory options. This label is located on the glove box door. For additional information on the Service Parts Identification Label, see a GM Parts Catalog.

Service Parts Identification		DO NOT REMOVE	
JG1M215KK700001			
B32	B37	CF4	FW9
L73	MM5	NA5	QUS
UM6	Z05	13L	62V
72U			
WA 90 VCC -8 4 ENAMEL			
EXAMPLE			
PRINTED IN U S A		PART NO 14065987	

KC0017-0A-M-RS

Figure 18 Service Parts Identification Label

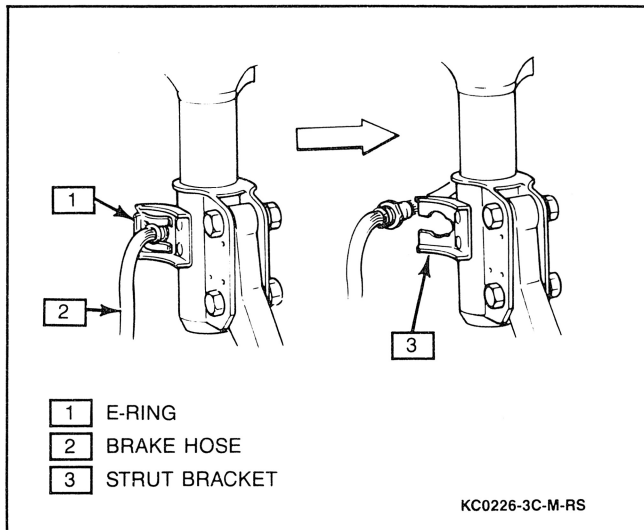


Figure 4 Brake Hose Removal

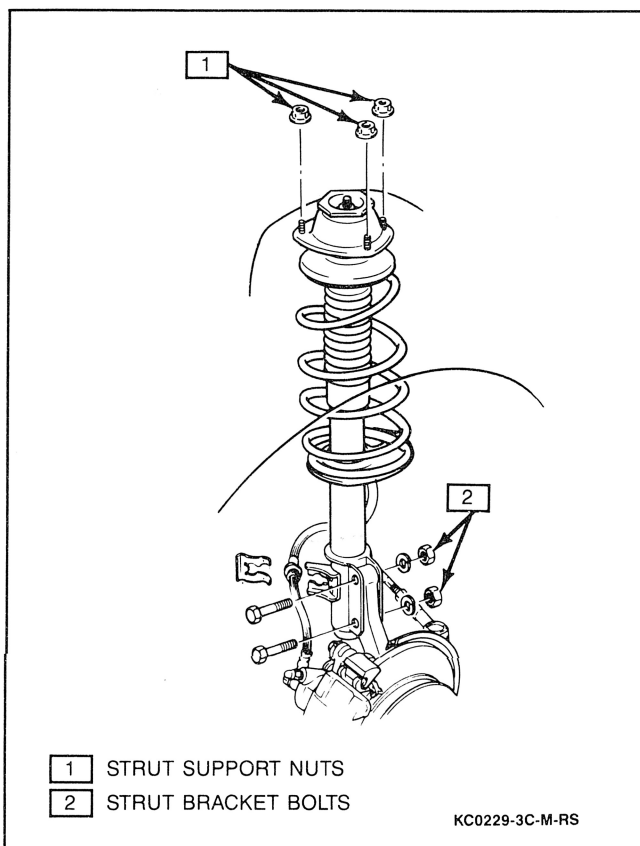


Figure 5 Strut Assembly Fasteners

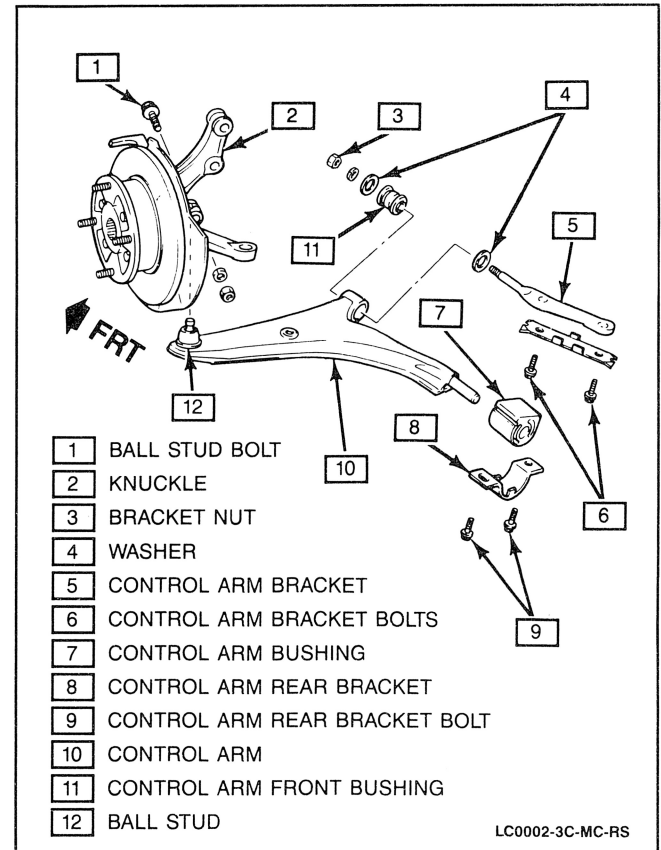


Figure 6 Control Arm

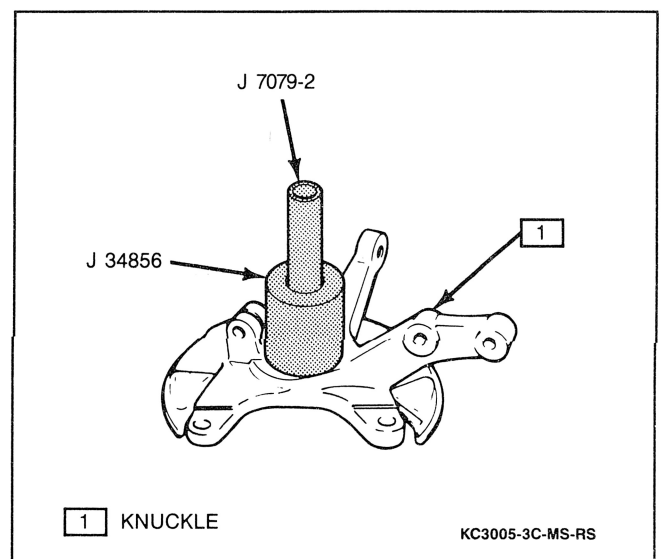


Figure 7 Outer Race Removal

12. Hub using a J 2619-01 slide hammer with a J 34866 hub puller.
13. Outside inner race from hub using a J 22912-01 bearing remover and press.
14. Inside inner race.
15. Inner and outer seals using a J 2619-01 slide hammer with a J 26941 seal puller.
16. Inner and outer bearings.
17. Snap ring from knuckle.
18. Outer race from knuckle using a J 34856 outer race remover and installer with a J 7079-2 driver handle (Figure 7).



Clean

- Hub and knuckle of any foreign material. Also clean any burrs from hub and knuckle race surface.



Install or Connect

Tools Required

- J 34856 Outer Race Remover and Installer
- J 7079-2 Driver Handle

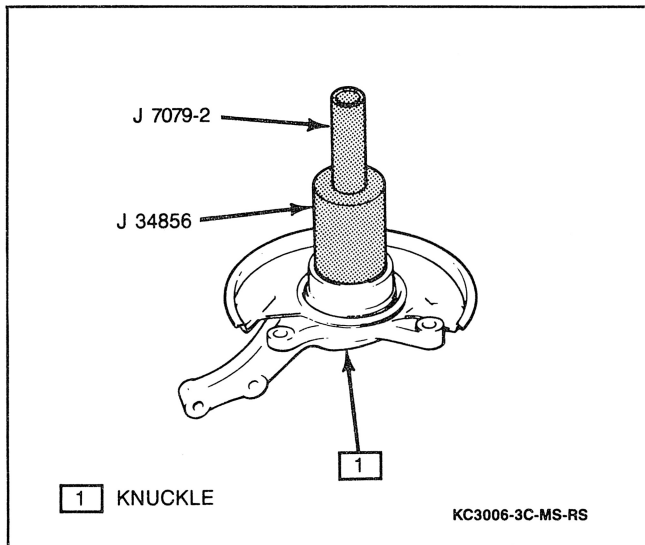


Figure 8 Outer Race Installation

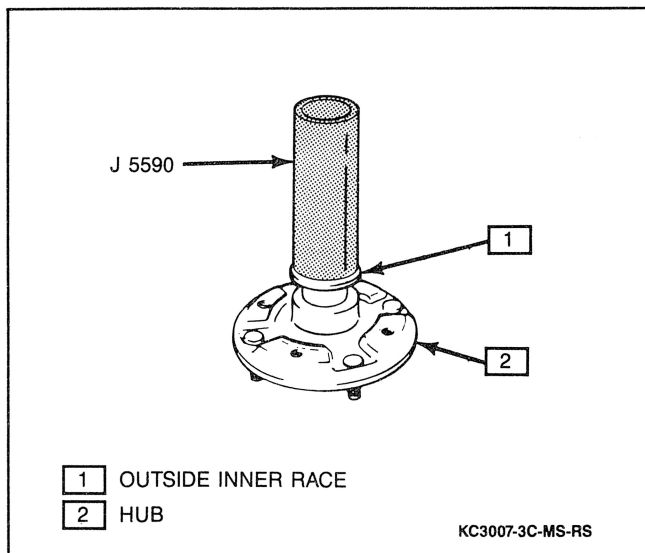


Figure 9 Outside Inner Race Installation

J 37983 Seal Installer

J 5590 Outside Inner Race Installer

1. Outside race into knuckle using a J 34856 outer race remover and installer with a J 7079-2 driver handle (Figure 8).
 - Apply GM #1051344 lubricant or equivalent to inside bearing and inside seal lip.
2. Inside bearing and inner race.
3. Inner seal using a J 37983 seal installer until seal is flush with surface of knuckle.
 - Apply GM #1051344 lubricant or equivalent to outside bearing and outer seal lip.
4. Outside bearing.
5. Outside seal using a J 37983 seal installer until seal contacts snap ring.
6. Outside inner race onto hub using a J 5590 outside inner race installer and a press (Figure 9).
 - Support knuckle and inside inner race.
 - Apply GM #1051344 lubricant or equivalent to hub race surfaces.

7. Hub into knuckle with a press.
8. Knuckle to vehicle, over ball stud while also aligning drive axle through hub.
9. Ball stud through bolt and nut loosely.
10. Lower strut mounting bolts while aligning marks.



Tighten

- Lower strut mounting bolts to 80 N·m (59 lb.ft.).
 - Ball stud through bolt to 60 N·m (44 lb.ft.).
11. Tie rod end into knuckle and install castle nut.



Tighten

- Tie rod end castle nut to 43 N·m (32 lb.ft.).
12. Cotter pin.
 13. Disc brake rotor.
 14. Disc brake rotor retaining screws.



Tighten

- Disc brake rotor retaining screws to 7.5 N·m (66 lb.in.).
 - Position brake caliper with carrier over rotor.
15. Brake caliper carrier bolts.



Tighten

- Brake caliper carrier bolts to 85 N·m (63 lb.ft.).
16. Drive axle washer and locknut.



Tighten

- Drive axle locknut to 175 N·m (129 lb.ft.).
 - Stake locknut.
17. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
 - Lower vehicle.



Important

- Wheel alignment should be checked to ensure proper tire wear and proper vehicle handling. Refer to WHEEL ALIGNMENT (SEC.3A) of the 1990 Geo Metro Service Manual.

WHEEL STUD

Figures 10 and 11



Remove or Disconnect

Tool Required

J 6627-A Wheel Stud Remover/Tie Rod End Remover

- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
1. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
 2. Brake caliper carrier bolts.

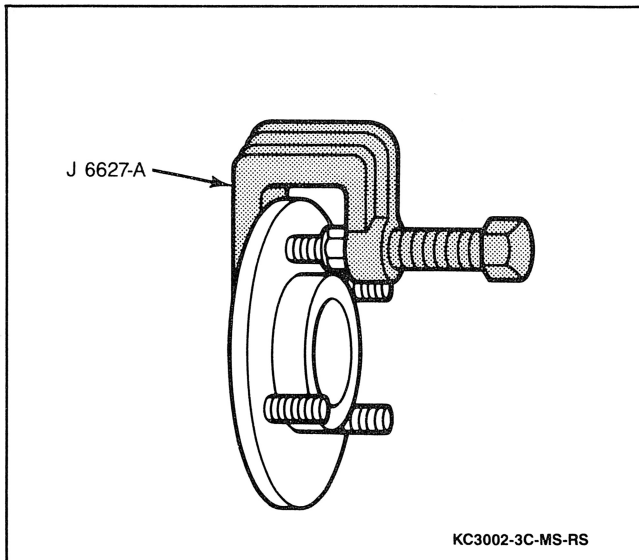


Figure 10 Wheel Stud Removal

3. Brake caliper with carrier; suspend from strut.
4. Disc brake rotor retaining screws.
5. Brake rotor by using two 8 mm bolts as pullers.
 - Turn hub to line up desired stud to be removed with caliper mount opening.
6. Wheel stud using a J 6627-A wheel stud remover.

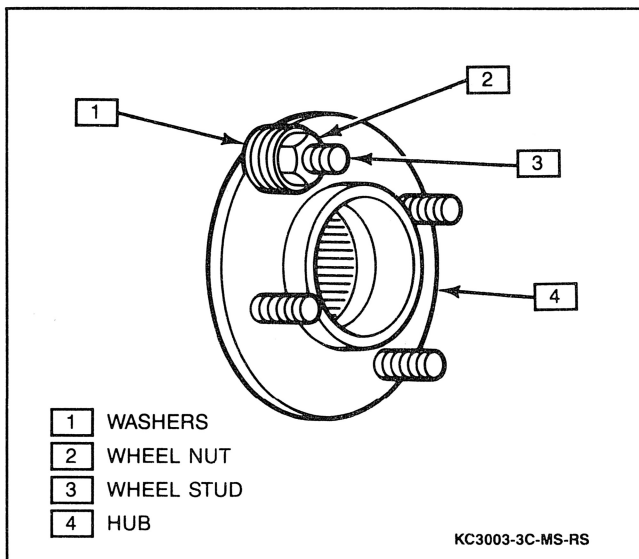


Figure 11 Wheel Stud Installation

Install or Connect

1. Wheel stud using washers as shims and a wheel nut (installed backwards) to pull stud into position.
2. Disc brake rotor and retaining screws.

Tighten

- Disc brake rotor retaining screws to 7.5 N·m (66 lb.in.).
 - Position caliper with carrier over rotor.
3. Caliper carrier bolts.

Tighten

- Caliper carrier bolts to 85 N·m (63 lb.ft.).
4. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
 - Lower vehicle.

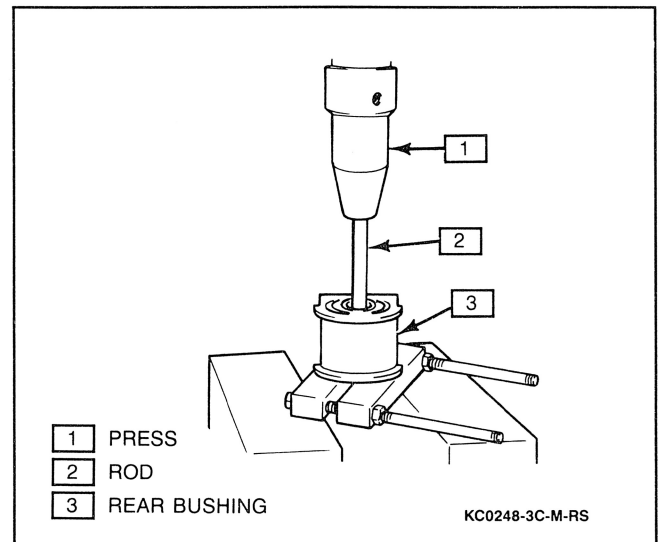


Figure 12 Rear Bushing Removal

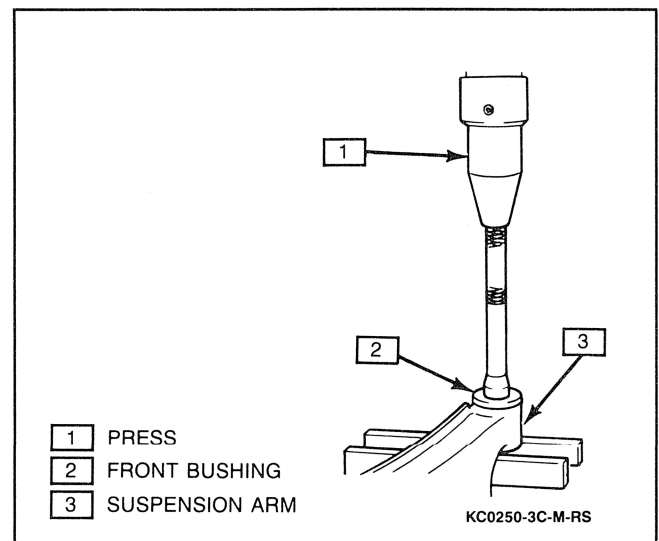


Figure 13 Front Bushing Removal

CONTROL ARM BUSHINGS

Figures 12 through 16

Remove or Disconnect

1. Control arm from vehicle. Refer to "Control Arm" earlier in this section.
2. Rear bushing using a press.
 - Cut off flange of front bushing.
3. Front bushing using a press.

Install or Connect

- Apply soap and water on circumference of bushing to facilitate installation.

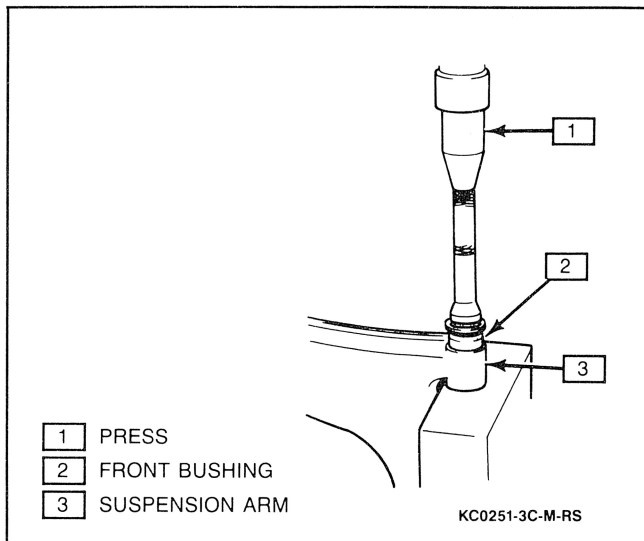


Figure 14 Front Bushing Installation

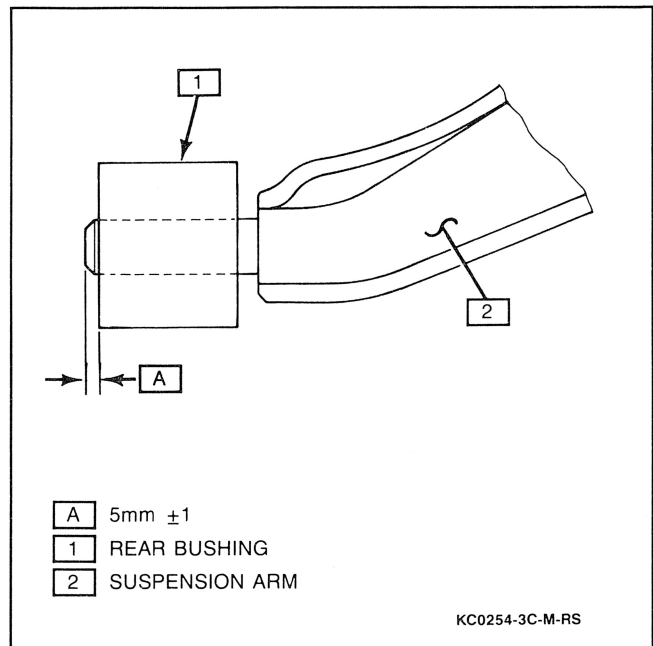


Figure 16 Rear Bushing Position

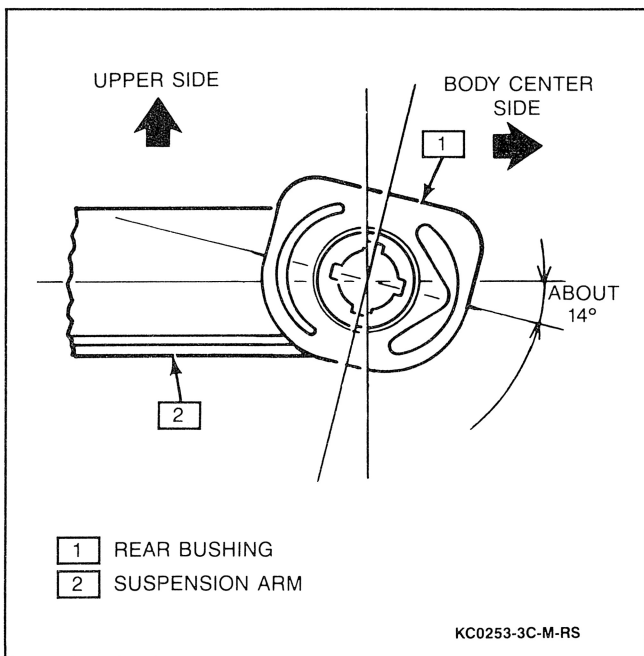


Figure 15 Rear Bushing Installation

1. Front bushing to control arm. Bushing should be centered in the control arm.
2. Rear bushing into control arm.
 - Drive rear bushing into position (Figure 15).
3. Control arm to vehicle. Refer to "Control Arm" earlier in this section.

UNIT REPAIR

DISASSEMBLE/ASSEMBLE STRUT

Figures 17 and 18

Tools Required

- J 3289-20 Holding Fixture Bench Mount
- J 34013-A Strut Spring Compressor
- J 34013-20 Damper Rod Clamp

J 34013-38 Alignment Rod

CAUTION: Strut springs are under high tension. Do not remove the strut piston rod top under support nut without using J 34013-A strut spring compressor.



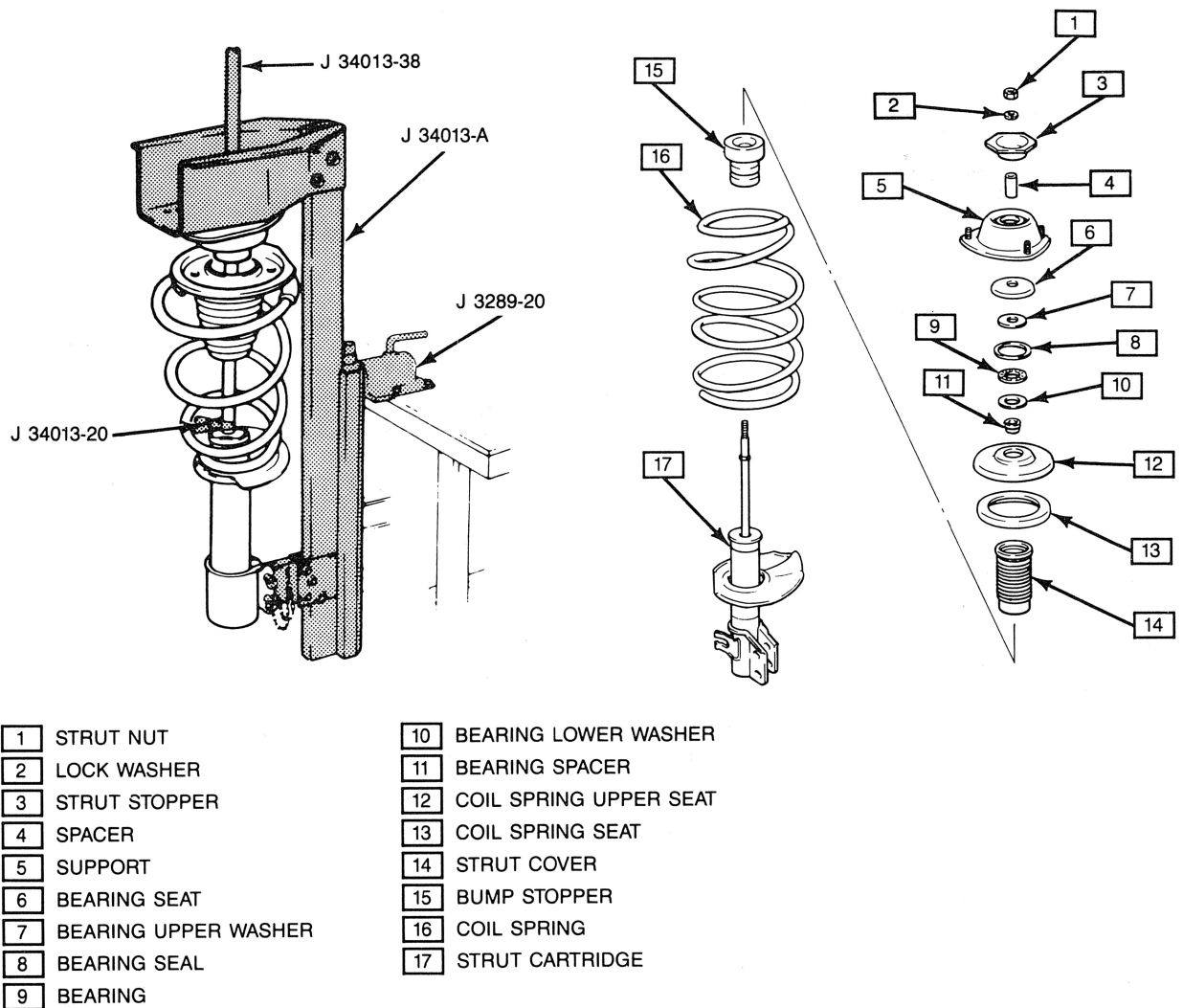
Disassemble

- Mount J 34013-A strut spring compressor into J 3289-20 holding fixture.
 - Attach strut assembly to J 34013-A strut spring compressor using both locking pins.
 - Turn compressor forcing screw while rotating the strut support to properly align the mounting studs and guide them through the compressor hood. The mounting studs must be aligned with the correct pattern in the hood (Figure 17).
 - Compress the strut spring approximately 13 mm (0.5-inch) by turning the compressor forcing screw.
1. Strut nut from top of strut assembly.
 2. Lock washer, strut stopper and spacer.
 - Place J 34013-38 alignment rod on damper rod and guide the damper rod through the strut spring upper seat while decompressing the strut spring.
 3. Strut cartridge from strut assembly.
 - Release strut spring from J 34013-A compressor and remove individual parts of the strut assembly as needed (Figure 16).



Assemble

- Attach strut assembly to J 34013-A strut spring compressor using both locking pins.
1. Spring onto strut assembly. Make sure that the spring is properly seated onto the strut spring lower seat.



LC1001-3C-MC-RS

Figure 17 Strut Spring Compressor

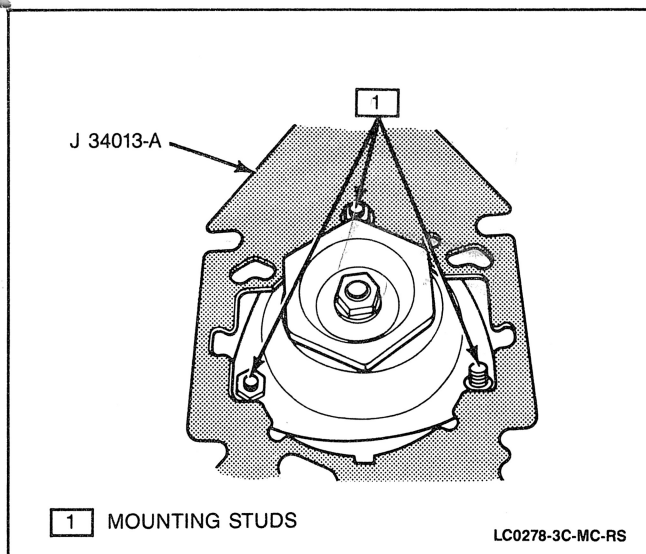


Figure 18 Correct Mounting Stud Pattern

- Pull up the damper rod to its full, extended length and install J 34013-20 damper rod clamp.
- 2. Bump stopper, strut cover and upper spring seat. Position arrow on the upper spring seat to point toward the arm of fixture.
- 3. Bearing spacer, bearing lower washer, bearing, bearing seal, bearing upper washer, bearing seat

and support to strut assembly. Make sure that all components are centered and properly aligned.

- Turn the compressor forcing screw while rotating the strut support to properly align the mounting studs and guide them through the compressor hood. The mounting studs must be aligned with the correct pattern in the hood assembly (Figure 17).
- Insert J 34013-38 alignment rod through upper strut assembly and screw it into strut damper shaft.
- Compress the strut spring by turning the compressor forcing screw and guide the damper shaft through the upper strut assembly with J 34013-38 alignment rod. Compress the strut spring until approximately 25 mm (1 inch) of the damper shaft is visible above the upper strut assembly.
- Remove J 34013-38 alignment rod and install strut stopper and strut nut.

**Tighten**

- Strut nut to 50 N·m (37 lb.ft.).
- Remove J 34013-20 damper rod clamp from damper rod.
- Decompress strut spring and remove strut assembly from J 34013-A strut spring compressor.

SPECIFICATIONS**FASTENER TORQUES**

Strut Assembly Upper Retaining Nuts	27 N·m (20 lb.ft.)
Strut Assembly Lower Retaining Bolts and Nuts	80 N·m (59 lb.ft.)
Control Arm Rear Bracket Bolts	43 N·m (32 lb.ft.)
Control Arm Bracket Bolts	80 N·m (59 lb.ft.)
Control Arm Bracket Nut	100 N·m (74 lb.ft.)
Ball Stud Through Bolt	60 N·m (44 lb.ft.)
Tie Rod End Castle Nut	43 N·m (32 lb.ft.)
Disc Brake Rotor Retaining Screws	7.5 N·m (66 lb.in.)
Brake Caliper Carrier Bolts	85 N·m (63 lb.ft.)
Drive Axle Locknut	175 N·m (129 lb.ft.)
Strut Nut	50 N·m (37 lb.ft.)

SPECIAL TOOLS

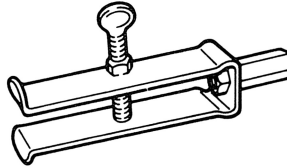
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J 6627-A



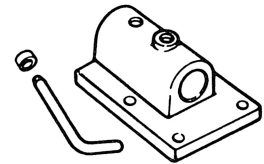
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J 26941



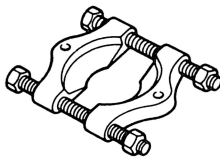
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J 3289-20



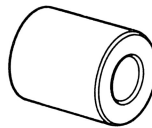
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J 22912-01



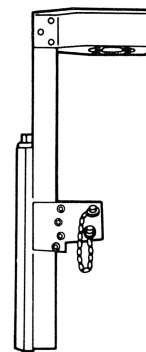
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J 34856



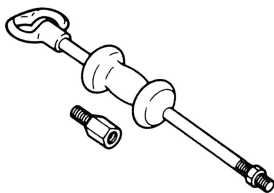
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J 34013-A



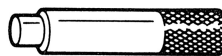
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J 2619-01



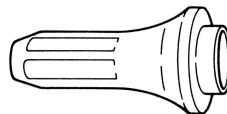
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J 7079-2



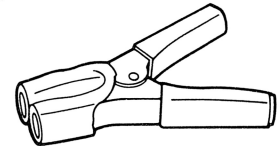
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J 37983



12

J 34013-20



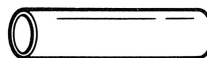
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J 34866



9

J 5590



13

J 34013-38



- 1 WHEEL STUD REMOVER/TIE ROD END REMOVER
- 2 BEARING REMOVER
- 3 SLIDE HAMMER
- 4 HUB PULLER
- 5 SEAL PULLER
- 6 OUTER RACE REMOVER AND INSTALLER
- 7 DRIVER HANDLE

- 8 SEAL INSTALLER
- 9 OUTSIDE INNER RACE INSTALLER
- 10 HOLDING FIXTURE BENCH MOUNT
- 11 STRUT SPRING COMPRESSOR
- 12 DAMPER ROD CLAMP
- 13 ALIGNMENT ROD

SECTION 3E

TIRES & WHEELS

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in Section 9J under ON-VEHICLE SERVICE before performing service on or around SIR components or SIR wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above conditions are not followed, parts or system damage could result.

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DIAGNOSIS

For tire and wheel diagnosis, refer to STEERING, SUSPENSION, TIRES AND WHEELS DIAGNOSIS (SEC.3) of the 1990 Geo Metro Service Manual.

GENERAL DESCRIPTION

REPLACEMENT TIRES

Most metric tire sizes do not have exact corresponding alphanumeric tire sizes. Replacement tires should be of the same size, load range and construction as those originally on the vehicle. Use of any other size or type tire may affect ride handling, speedometer/odometer calibration, vehicle ground clearance and tire or snow chain clearance to the body and chassis.

NOTICE: Do not mix different types of tires on the same vehicle such as radial, bias and bias-belted tires except in emergencies, because vehicle handling may be seriously affected and may result in loss of vehicle control.

It is recommended that new tires be installed in pairs on the same axle. If necessary to replace only one tire, it should be paired with the tire having the most tread, to equalize braking traction.

ALL SEASON TIRES

All models of the Metro Convertible are equipped with metric sized (P165/65 R13) steel belted radial tires. The tires are designed to operate satisfactorily with loads up to the full rated capacity when inflated to the recommended inflation pressures. Correct tire pressures and driving habits have an important influence on the tire life. Heavy cornering, excessively rapid acceleration and unnecessary sharp braking increase tire wear, decreasing tire life.

P-METRIC TIRES

Figures 1 and 2

Metric tire size format is shown in Figure 1. When replacement is necessary, the original equipment type tire should be used; refer to the tire placard.

The metric term for tire inflation pressure is the kilopascal (kPa). Tire pressures will usually be printed in both kPa and psi on the tire placard. Metric tire gages are available from tool suppliers. Refer to Figure 2 for metric/English (kPa/psi) conversion.

TIRE PLACARD

Figure 3

The tire placard is located on the left door lock pillar and should be referred to for tire information.

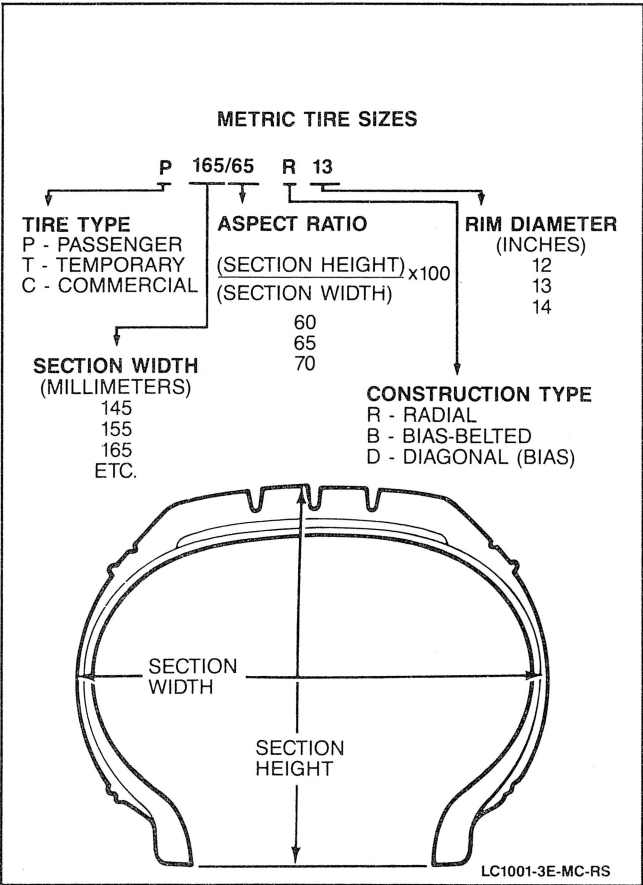


Figure 1 Metric Tire Size Format

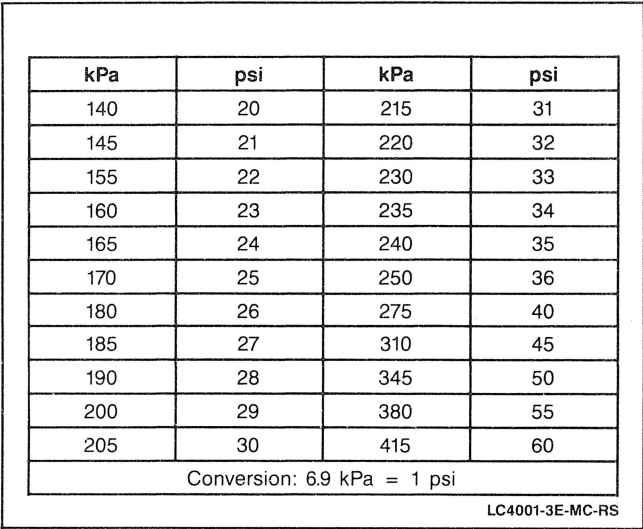


Figure 2 Tire Pressure Conversion Chart

The placard lists the maximum load, tire size and cold tire pressure where applicable.

WHEELS

Standard equipment wheels on the Metro Convertible are 4.50J x 13 inch steel wheels.

Replacement wheels must be equivalent to the original equipment wheels in load capacity, diameter, rim width, offset and mounting configuration. A wheel of improper size or type may affect wheel and bearing life, brake cooling, speedometer/odometer calibration,

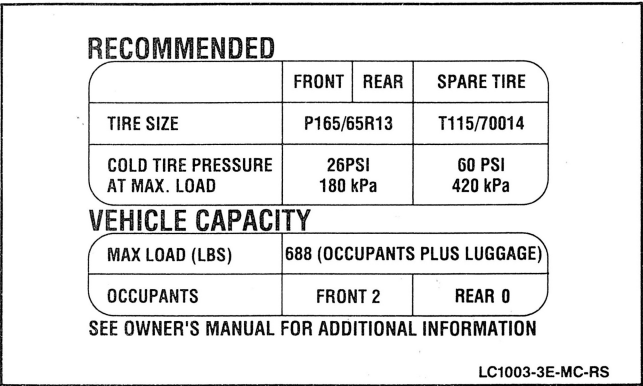


Figure 3 Tire Placard

vehicle ground clearance and tire clearance to the body and chassis.

ON-VEHICLE SERVICE

WHEEL REPAIR

Wheel repairs that use welding, heating or peening are not approved. All damaged wheels should be replaced.

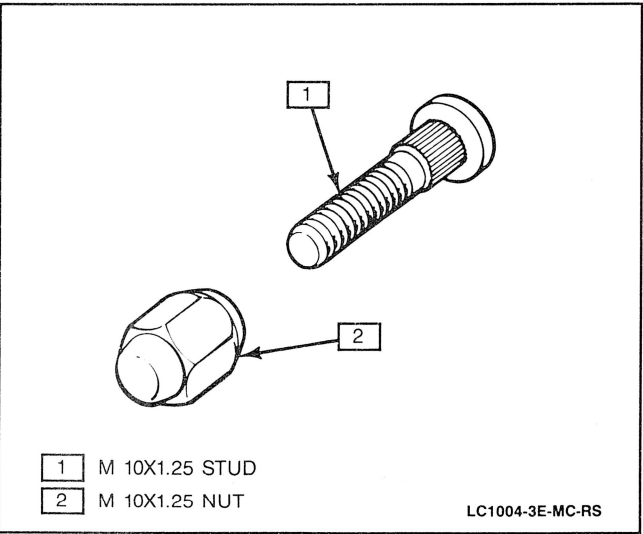


Figure 4 Metric Stud and Nut

METRIC WHEEL NUTS AND STUDS

Figure 4

Most models use metric wheel nuts and wheel studs. The thread size of the metric wheel nuts and studs is "M10x1.25." This stands for:

- M = Metric
- 10 = Diameter in millimeters
- 1.25 = Millimeters per thread

If a broken stud is found, refer to FRONT SUSPENSION (SEC.3C) for front wheel stud replacement or REAR SUSPENSION (SEC.3D) of the 1990 Geo Metro Service Manual for rear wheel stud replacement.

TIRE INFLATION

The pressure recommended for any model is

3. Make a scribe mark across the strut/knuckle interface (C).

STRUT ASSEMBLY

Figures 3, 4 and 5

Remove or Disconnect

- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
1. Wheel and tire assembly. Refer to TIRES AND WHEELS (SEC.3E).
 2. E-ring securing the brake hose and brake hose from strut bracket.
 3. Three nuts retaining upper portion of strut assembly.

NOTICE: Hold strut assembly to prevent it from falling off the vehicle.

4. Two lower retaining nuts and bolts and remove strut assembly.

Install or Connect

1. Strut to vehicle; secure with three upper retaining nuts.
2. Two lower retaining bolts and nuts.

Tighten

- Upper retaining nuts to 27 N·m (20 lb.ft.).
 - Lower retaining bolts and nuts to 80 N·m (59 lb.ft.).
3. Brake hose to strut bracket; secure with E-ring.

NOTICE: Do not twist brake hose when installing it. Install E-ring until it fits securely into the bracket end surface.

4. Wheel and tire assembly. Refer to TIRES AND WHEELS (SEC.3E).
- Lower vehicle.

CONTROL ARM

Figure 6

Remove or Disconnect

- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
1. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
 2. Ball stud nut and bolt.
 3. Control arm bracket retaining nut and bolts.
 4. Control arm bracket.
 5. Two bolts and control arm rear bracket.
 6. Control arm from vehicle.

Install or Connect

1. Control arm bracket to control arm; secure with one nut. Do not tighten fully.

2. Control arm to vehicle; secure control arm bracket to body with two bolts. Do not tighten fully.
3. Ball stud to knuckle. Align ball stud groove with knuckle bolt hole and drive in ball stud bolt. Secure with ball stud nut.
4. Control arm rear bracket; secure with two bolts.

Tighten

- Control arm rear bracket bolts to 43 N·m (32 lb.ft.).
 - Control arm bracket bolts to 80 N·m (59 lb.ft.).
 - Control arm bracket nut to 100 N·m (74 lb.ft.).
5. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
- Lower vehicle.

Inspect

- Toe and adjust as required.

HUB, BEARING AND SEAL

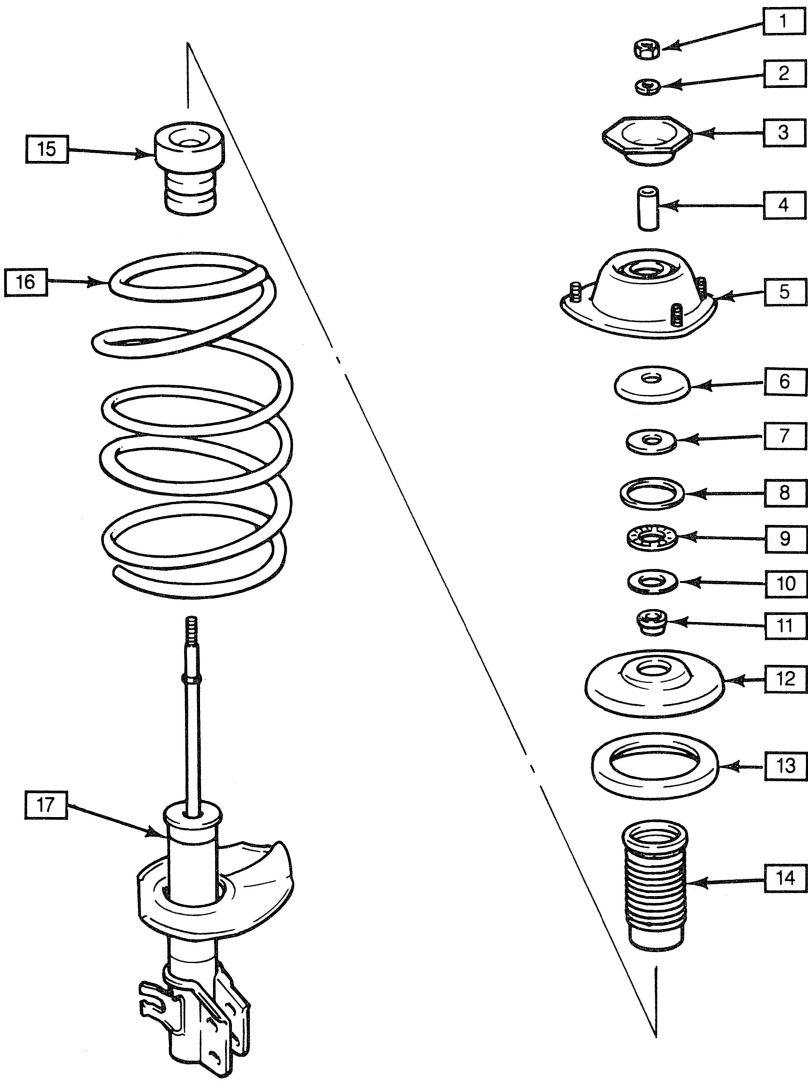
Figures 7, 8 and 9

Remove or Disconnect

Tools Required

J 6627-A Wheel Stud Remover/Tie Rod End Remover
J 2619-01 Slide Hammer
J 34866 Hub Puller
J 22912-01 Bearing Remover
J 26941 Seal Puller
J 34856 Outer Race Remover and Installer
J 7079-2 Driver Handle

- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
1. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
 - Release staked portion of drive axle nut using a punch and a hammer.
 2. Drive axle nut and washer.
 3. Brake caliper carrier bolts.
 4. Brake caliper with carrier; suspend from strut.
 5. Disc brake rotor retaining screws.
 6. Brake rotor by using two 8 mm bolts as pullers.
 7. Cotter pin and castle nut from tie rod.
 8. Tie rod end using J 6627-A wheel stud remover/tie rod end remover.
 9. Ball stud through bolt.
 - Mark lower strut bolts for reassembly in the same location.
 10. Lower strut mounting bolts.
 11. Knuckle from vehicle and place into a vise securely.



- | | |
|------------------------|---------------------------|
| 1 NUT | 10 BEARING LOWER WASHER |
| 2 WASHER | 11 BEARING SPACER |
| 3 STOPPER | 12 COIL SPRING UPPER SEAT |
| 4 INNER SPACER | 13 COIL SPRING SEAT |
| 5 SUPPORT COMP. | 14 STRUT COVER |
| 6 BEARING SEAT | 15 BUMP STOPPER |
| 7 BEARING UPPER WASHER | 16 COIL SPRING |
| 8 BEARING SEAL | 17 STRUT |
| 9 BEARING | |

Figure 3 Strut Assembly

WIRING REPAIRS

Wiring repair procedures are included in ELECTRICAL DIAGNOSIS (SEC.8A) and in SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM (SEC.9J). When repairing any wiring associated with the SIR system, **ALWAYS USE THE "CRIMP AND SEAL SPLICE SLEEVES" CONTAINED IN J 38125, TERMINAL REPAIR KIT.**

INFLATOR MODULE

Figure 4

Important

- In the event deployment has occurred, inspect the coil assembly wire for any signs of scorching, melting or other damage due to excessive heat. If the coil assembly is damaged, replace it.

Remove or Disconnect

- Disable the SIR system. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.
1. Battery negative (-) cable.
 2. Four screws from the back of the steering wheel.
 3. Inflator module from steering wheel.

CAUTION: When carrying a live Inflator Module, make sure the bag and trim cover are pointed away from you. Never carry the Inflator Module by the wires or connector on the underside of the module. In case of an accidental deployment, the bag will then deploy with minimal chance of injury. When placing a live Inflator Module on a bench or other surface, always face the bag and trim cover up, away from the surface. Never rest a steering column assembly on the steering wheel with the Inflator Module face down and column vertical. This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment. Otherwise, personal injury could result.

Install or Connect

- Turn ignition "OFF."
1. Inflator module to steering wheel; secure with 4 screws.

Tighten

- Inflator module screws to 10 N·m (89 lb. in.).
2. Battery negative (-) cable.
 - Enable the SIR system. Refer to "Enabling the SIR System" located under "Service Precautions" earlier in this section.

STEERING WHEEL

Figure 5

Remove or Disconnect

Tools Required

- J 8433-1 Puller Bar
- J 8433-3 Puller Screw

NOTICE: The SIR coil assembly is easily damaged if the correct tool is not used.

- Disable the SIR system. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.
1. Battery negative (-) cable.
 2. SIR inflator module. Refer to "Inflator Module" earlier in this section.
 3. Steering wheel retaining nut.
 4. Steering wheel from column using a J 8433-1 puller bar with a J 8433-3 puller screw and 2 1/4 x 2-inch through bolts and nuts (Figure 5).
 5. Horn switch screws and horn switches from steering wheel.
 6. Rear steering wheel cover screws and rear steering wheel cover from steering wheel.

Install or Connect

1. Rear steering wheel cover to steering wheel; secure with retaining screws.
2. Horn contact switches to steering wheel; secure with retaining screws.
3. Steering wheel to column, securing with retaining nut.

Tighten

- Steering wheel retaining nut to 34 N·m (25 lb.ft.).
4. SIR inflator module. Refer to "Inflator Module" earlier in this section.
 5. Battery negative (-) cable.
 - Enable the SIR system. Refer to "Enabling the SIR System" located under "Service Precautions" earlier in this section.

MULTIFUNCTION TURN SIGNAL LEVER

The turn signal lever is incorporated into the SIR coil and turn signal/dimmer switch assembly. Service is by replacement only. Refer to SUPPLEMENTAL INFLATABLE RESTRAINT STEERING COLUMN UNIT REPAIR (SEC.3F4A) for removal and installation procedures.

IGNITION SWITCH

Remove or Disconnect

- Disable the SIR system. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.

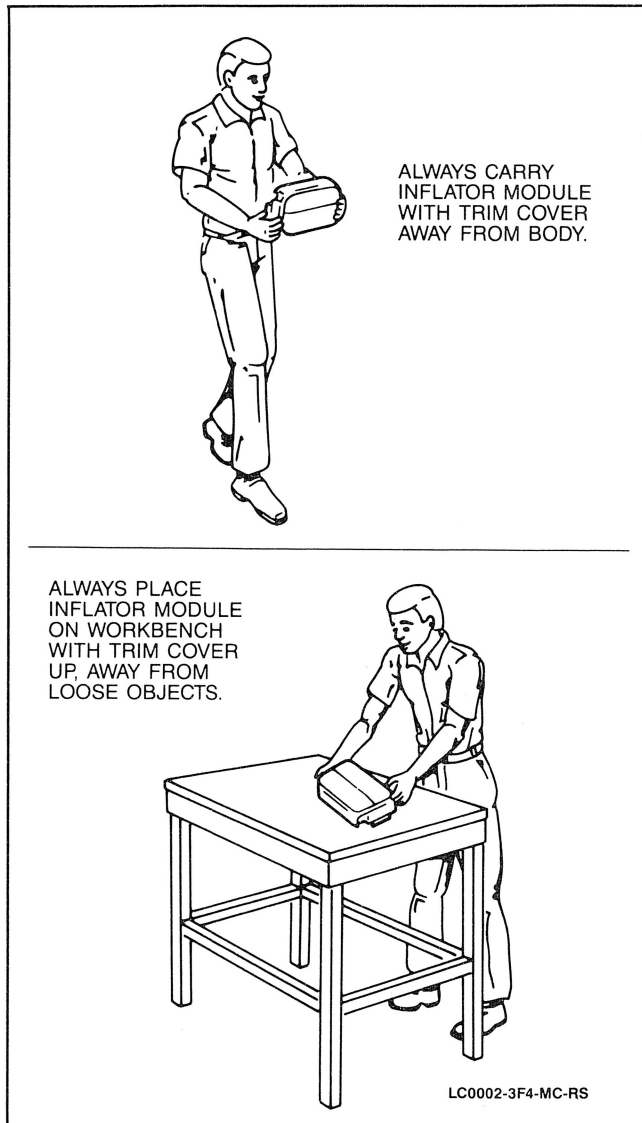


Figure 2 Proper Live Inflator Module Handling

HANDLING PRECAUTIONS

Live Inflator Modules

Handling and Storage

Figure 2

Special care is necessary when handling and storing a live (undeployed) Inflator Module. The rapid gas generation produced during deployment of the air bag could cause the Inflator Module, or object in front of the Inflator Module, to be thrown through the air in the unlikely event of an accidental deployment.

CAUTION: When carrying a live Inflator Module, make sure the bag and trim cover are pointed away from you. Never carry the Inflator Module by the wires or connector on the underside of the module. In case of an accidental deployment, the bag will then deploy with minimal chance of

injury. When placing a live Inflator Module on a bench or other surface, always face the bag and trim cover up, away from the surface. Never rest a steering column assembly on the steering wheel with the Inflator Module face down and column vertical. This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment. Otherwise, personal injury could result.

Disposal

CAUTION: Failure to follow proper SIR Inflator Module disposal procedures can result in air bag deployment which could cause personal injury. Undeployed Inflator Modules must not be disposed of through normal refuse channels. The undeployed Inflator Module contains substances that can cause severe illness or personal injury if the sealed container is damaged during disposal. Disposal in any manner inconsistent with proper procedures may be a violation of federal, state and/or local laws.

Geo dealers should refer to the latest Geo Service bulletins for proper SIR Inflator Module disposal procedures. All others should contact a local Geo dealership for proper SIR Inflator Module disposal procedures.

Deployed Inflator Modules

Handling

After an Inflator Module has been deployed, the surface of the air bag may contain a small amount of sodium hydroxide dust (a by-product of the reaction which takes place during deployment) combined with a white packing powder (used to ease deployment of the bag). The sodium hydroxide dust could be irritating to the skin if left on for an extended period of time.

CAUTION: Safety precautions must be observed when handling a deployed Inflator Module. After deployment, the air bag surface may contain deposits of sodium hydroxide dust, a by-product of the sodium azide reaction during deployment that is irritating to the skin. Always wear gloves and safety glasses when handling a deployed Inflator Module, and wash your hands with a mild soap and water afterwards.

Disposal

Deployed Inflator Modules may be scrapped at the dealership using normal scrapping procedures.

INSPECTIONS REQUIRED AFTER AN ACCIDENT

! Important

- All SIR system components, including harness and brackets, must be inspected after an accident. If any are damaged or bent, they must be replaced even if a deployment did not occur. Inspect steering column and steering column support brackets and braces for damage. Do not attempt to repair the forward discriminating sensor, passenger compartment discriminating sensor, arming sensor, DERM, coil assembly or inflator module. Service is by replacement only. Any wire harness damage must be repaired only with the crimp and seal splice sleeves contained within J 38125, Terminal Repair Kit. Verify replacement inflator module part number as some GM inflator modules look identical but contain different internal components.

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the passenger compartment discriminating sensor, arming sensor, forward discriminating sensor and the inflator module. Any visible damage to the sensors and/or their respective mounting brackets requires replacement, whether a deployment occurred or not.

ON-VEHICLE SERVICE

SERVICE PRECAUTIONS

The DERM can maintain sufficient voltage to cause a deployment for up to 10 minutes after the Ignition Switch is turned "OFF" and the battery is disconnected. Many of the service procedures require disconnection of the SIR IG Fuse and Inflator Module from the deployment loop to avoid an accidental deployment. Diagnostic procedures do not normally require fuse removal or disconnection of the Inflator Module. Always refer to GM service procedures for diagnosis.

CAUTION: When performing service on or around SIR components or SIR wiring, follow the procedures listed below to temporarily disable the SIR system. Refer to appropriate service manual procedures. Failure to follow procedures could result in possible air

bag deployment, personal injury or unneeded SIR system repairs.

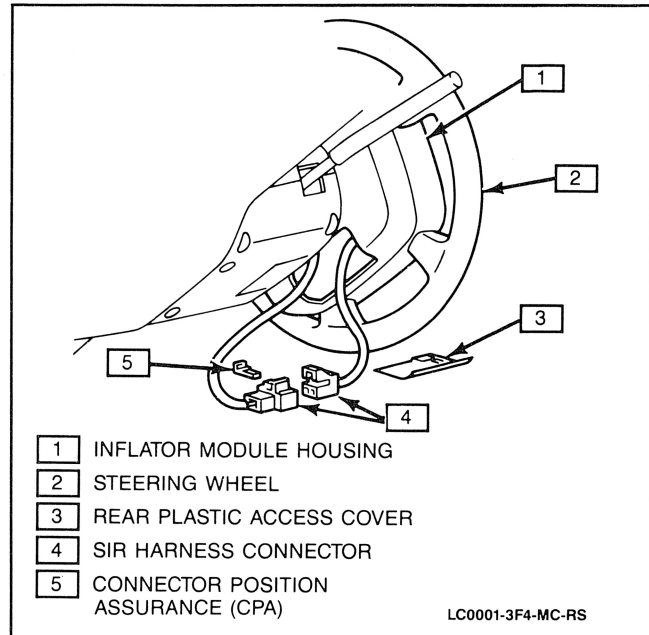


Figure 1 SIR Harness Connector

Disabling the SIR System

Figure 1

↔ Remove or Disconnect

- Turn ignition switch to "OFF."
1. SIR IG Fuse from the SIR fuse block.
 2. Rear plastic access cover from inflator module housing.
 3. Connector position assurance (CPA) and yellow two-way connector inside the inflator module housing.

Enabling the SIR System

Figure 1

→← Install or Connect

- Turn ignition switch to "OFF."
1. Yellow two-way connector and connector position assurance (CPA) inside the inflator module housing.
 2. SIR IG Fuse to the SIR fuse block.
 3. Rear plastic access cover to inflator module housing.
- Turn ignition switch to "RUN." Observe "INFLATABLE RESTRAINT" indicator lamp. If lamp does not flash 7 to 9 times and then remain off, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).

SECTION 3F4

SUPPLEMENTAL INFLATABLE RESTRAINT STEERING WHEEL AND COLUMN

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: The procedures in this section must be followed in the order listed to temporarily disable the Supplemental Inflatable Restraint (SIR) System and prevent false diagnostic codes from setting. Failure to follow procedures could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above conditions are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

The steering column is an energy absorbing mechanism designed to collapse in the event of a collision, minimizing the possibility of injury to the driver.

The ignition switch is column-mounted and the column can be locked to inhibit theft. The multifunction turn signal lever controls the headlamp operation (between high beam and low beam) and turn signal operation.

The steering column can be removed and disassembled with relative ease. To ensure that proper column energy absorption is maintained, use only the specified screws, bolts and nuts and tighten them to the specified torques.

If the column assembly is removed from the vehicle, take special care when handling it. Using a steering wheel puller other than the one recommended in this manual, hitting the end of the steering shaft and sharply leaning on or dropping the assembly could shear or loosen the plastic fasteners that keep the column rigid.

IGNITION LOCK SYSTEM

All steering columns contain a mechanical neutral start system. This system relies on a mechanical

block to prevent starting the engine with the transaxle in any position other than "PARK" or "NEUTRAL."

BRAKE TRANSAXLE SHIFT INTERLOCK (BTSI)

All models of this vehicle equipped with an automatic transaxle will incorporate a brake transaxle shift interlock system. This will lock the transaxle in "PARK" until the brake pedal is depressed. Refer to AUTOMATIC TRANSAXLE (SEC.7A) of the 1990 Geo Metro Service Manual for additional information, diagnosis and on-vehicle service of the brake transaxle shift interlock system.

LUBRICATION

Apply a thin coat of lithium grease to all friction points when reassembling.

DIAGNOSIS

For diagnosis of the Supplemental Inflatable Restraint System, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A). For diagnosis of the Brake Transaxle Shift Interlock, refer to AUTOMATIC TRANSAXLE (SEC.7A) of the 1990 Geo Metro Service Manual.

carefully calculated to give a satisfactory ride, stability, steering, tread wear, tire life and resistance to bruises.

Tire pressure, with tires cold (after vehicle has sat for three hours or more or has been driven less than one mile), should be checked monthly or before any extended trip. The front and rear tires require 180 kPa (26 psi) of air. It is normal for tire pressure to increase 28 kPa (4 psi) when the tires become hot during driving. **Do not** bleed or reduce tire pressure after driving. Bleeding reduces the cold inflation pressure.

Valve caps should be on the valves to keep dust and water out.

Higher Than Recommended Pressure

Tires inflated to a higher than recommended pressure can cause:

- Hard ride.
- Tire bruising or carcass damage.
- Rapid tread wear at center of tire.

Lower Than Recommended Pressure

Tires inflated to a lower than recommended pressure can cause:

- Tire squeal on turns.
- Hard steering.
- Rapid and uneven wear on the edges of the tread.
- Tire rim bruises and rupture.
- Tire cord damage.
- High tire temperatures.
- Reduced handling.
- Reduced fuel economy.

Unequal Pressure on Same Axle

Unequal tire pressure on the same axle can cause:

- Uneven braking.
- Steering lead.
- Reduced handling.
- Swerve on acceleration.

WHEEL INSTALLATION

Figure 5

NOTICE: Before installing wheels, remove any buildup of corrosion on the wheel mounting surface and brake drum or disc mounting surface by scraping and wire brushing. Installing wheels without good metal-to-metal contact at the mounting surfaces can cause wheel nuts to loosen, which can later allow a wheel to come off while the vehicle is moving.

Install or Connect

1. Wheel to vehicle; secure with 4 wheel nuts.

Important

- Wheel nuts must be tightened in sequence and to proper torque to avoid bending the wheel, brake drum or disc. Refer to Figure 5.

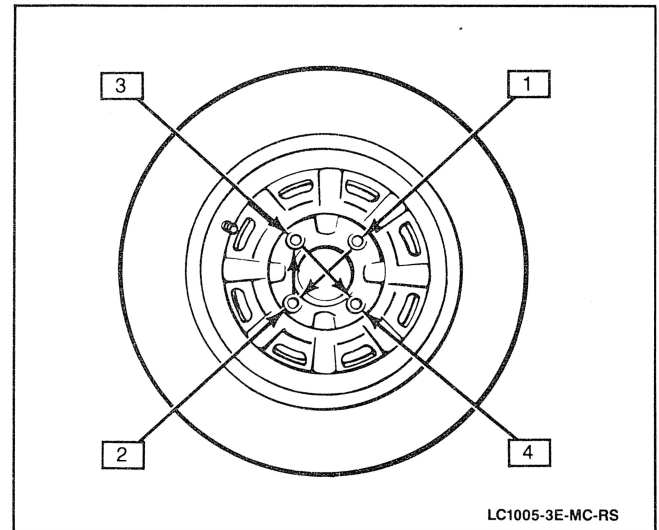


Figure 5 Wheel Nut Tightening Sequence

Tighten

- Wheel nuts to 60 N·m (44 lb.ft.).
- Lower vehicle.

Inspect

- Wheel alignment and matching of tread wear. Adjust as necessary.

WHEEL REMOVAL

Remove or Disconnect

- Loosen wheel nuts by approximately 180 degrees (half a turn).
- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).

1. Wheel nuts and wheel from vehicle.

Sometimes wheels can be difficult to remove from the vehicle due to foreign material or a tight fit between the wheel center hole and the hub or rotor. These wheels can be removed without damage as follows:

1. Tighten all wheel nuts on the affected wheel, then loosen each wheel nut two turns.
2. Lower vehicle.
3. Rock the vehicle from side to side as hard as possible using one or more person's body weight to loosen the wheel. Rock the vehicle from "DRIVE" (A/T) or "FIRST" (M/T) to "REVERSE" allowing the vehicle to move several feet in each direction. Apply quick, hard jabs on the brake pedal to loosen the wheel.
4. Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
5. Remove the wheel nuts and the wheel. Penetrating oil has not been found to be effective in removing tight wheels; however, if it is used, it should be applied sparingly to the wheel's center hole area only.

CAUTION: Do not allow the penetration oil to get on the vertical surfaces between the wheel and the drum (or rotor) because penetrating oil in this area could cause the wheel to work loose as the vehicle is driven causing loss of control.

NOTICE: NEVER use heat to loosen a tight wheel because the application of heat to the wheel can shorten the life of the wheel, wheel nuts and wheel bearings. Excessive force, such as hammering the wheel or tire, can also cause damage and is not recommended. Slight tapping of the tire sidewall, such as with one's hand or a rubber mallet, is normally acceptable.

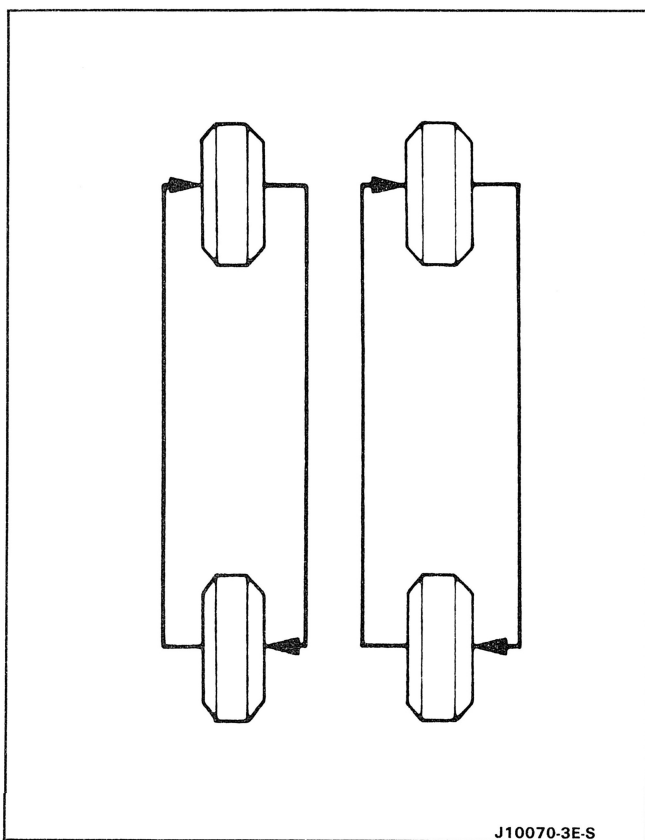


Figure 6 Tire Rotation Pattern

TIRE ROTATION

Figure 6

To equalize wear, rotate tires using the recommendations in Figure 6. Radial tires should be rotated every 12,500 km (7,500) miles.

TIRE MOUNTING AND DISMOUNTING

Use a tire changing machine to mount or dismount tires. Follow the equipment manufacturer's instructions. Do not use hand tools or tire irons alone to change tires as they may damage the tire beads or wheel rim.

Steel wheel rim bead seats should be cleaned with a wire brush or coarse steel wool to remove lubricants, old rubber and light rust. Before mounting a tire, the

bead area should be well lubricated with an approved tire lubricant.

After mounting, inflate the tire to 220 kPa (32 psi) so that beads are completely seated. Install valve core and inflate to proper pressure.

CAUTION: To avoid serious personal injury, do not stand over tire when inflating. The bead may break when bead snaps over safety hump. Do not exceed 220 kPa (32 psi) pressure when inflating any tire if beads are not seated. If 220 kPa (32 psi) pressure will not seat beads, deflate, relubricate the beads and reinflate. Overinflation may cause the bead to break and cause serious personal injury.

TIRE REPAIR

There are many different materials on the market used to repair tires. Manufacturers have published detailed instructions on how and when to repair tires. These instructions can be obtained from the tire manufacturer if they are not included with the repair kit.

MEASURING WHEEL RUNOUT

Figure 7

Wheel runout should be measured with an accurate dial indicator. Measurements may be taken with wheel installed on or off the vehicle using an accurate mounting surface, such as on a wheel balancer. Measurements may also be taken with or without the tire mounted on the wheel.

Radial runout and lateral runout should be measured on both the inboard rim flanges. With the dial indicator firmly in position, slowly rotate the wheel one revolution and record the total indicator reading. If any measurement exceeds specifications, and there is a vibration that wheel balancing will not correct, the wheel should be replaced. Disregard any indicator readings due to welds, paint runs, scratches, etc.

SPARE TIRE

CAUTION: All models are equipped with a high-pressure compact spare (T115/70D14) located in the trunk. Replacement of this wheel must consist of an equivalent to the originally equipped wheel in load capacity, diameter, rim width, offset and mounting configuration. A wheel of improper size may result in loss of control, personal injury or property damage.

NOTICE: The compact spare tire wheel should not be used with standard tires, snow tires, wheel covers or trim rings. If such use is attempted, damage to these items or other parts of the vehicle may occur. The compact spare should only be used on vehicles which offered it as original equipment.

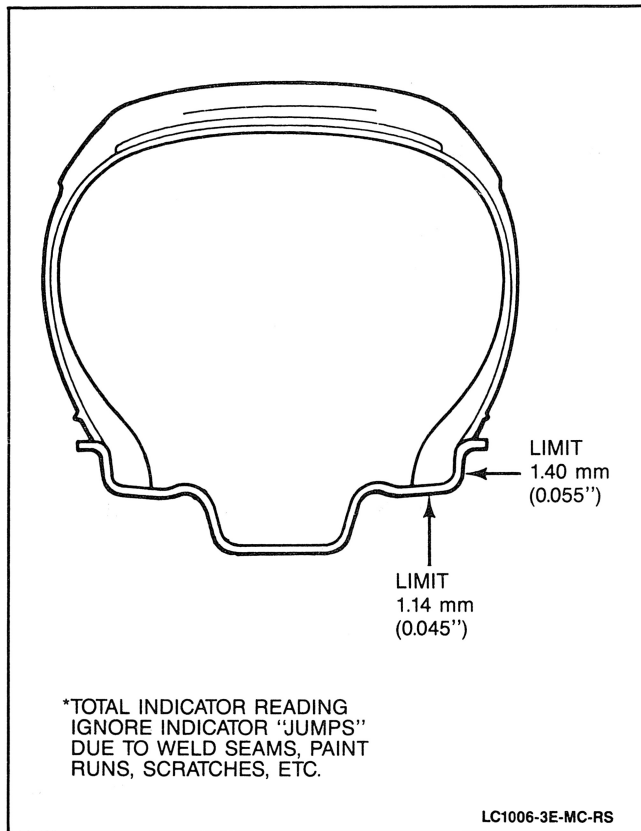


Figure 7 Wheel Runout

Inflation pressure of the compact spare must be periodically checked and maintained at 420 kPa (60 psi). It can be mounted and dismounted from its wheel using present tire changing procedures. As with other tires, the beads should completely seat at 275 kPa (40 psi). The tire may be safely inflated to 420 kPa (60 psi).

CAUTION: To avoid serious personal injury, do not stand over the tire when inflating. The bead may break when bead snaps over safety hump. Do not exceed 275 kPa (40 psi) pressure when inflating tire if beads are not seated. If 275 kPa (40 psi) pressure will not seat beads, deflate, relubricate the beads and reinflate. Overinflation may cause the bead to break and cause serious personal injury.

BALANCING TIRE AND WHEEL

Figures 8 and 9

There are two types of wheel and tire balance, static and dynamic. Static balance is the equal distribution of weight around the wheel. Assemblies that are statically unbalanced, cause a bouncing action called tramp. This condition will eventually cause uneven tire wear.

Dynamic balance is the equal distribution of weight on each side of the wheel centerline so that when the tire spins there is no tendency for the assembly to move from side to side. Assemblies that are dynamically unbalanced may cause shimmy.

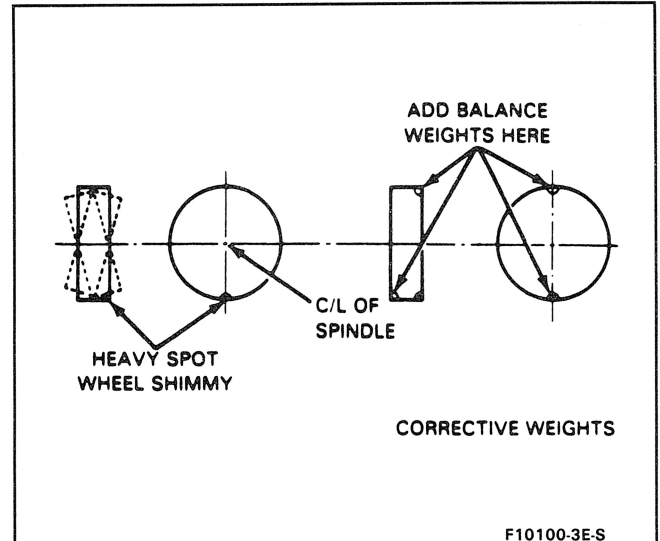


Figure 8 Static Unbalance Correction

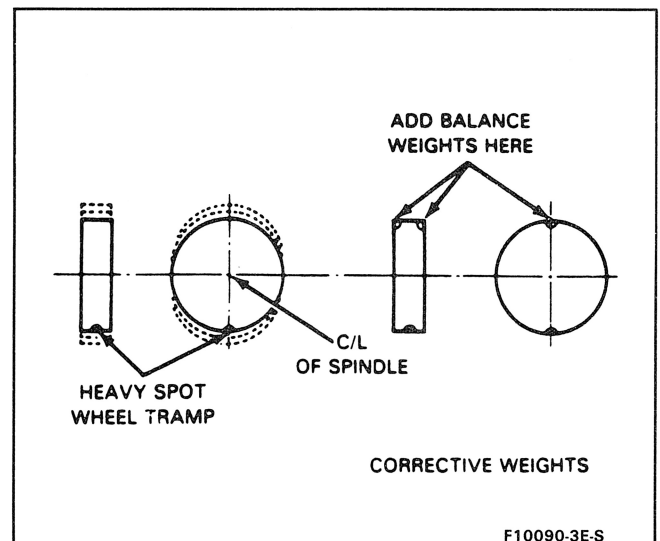


Figure 9 Dynamic Unbalance Correction

General Balance Precautions

Deposits of foreign material must be cleaned from the inside of the wheel.

CAUTION: Stones should be removed from the tread to avoid operator injury during spin balancing and to obtain a good balance.

The tire should be inspected for any damage, then balanced according to the equipment manufacturer's recommendations.

Off-Vehicle Balancing

Figure 10

Most electronic off-vehicle balancers are more accurate than the on-vehicle spin balancers. They are easy to use and give a dynamic (two plane) balance. Although they do not correct for drum or disc unbalance as does on-vehicle spin balancing, this is overcome by their accuracy.

On-Vehicle Balancing

When needed, on-vehicle balancing will help correct vibrations due to brake drum, rotor, and wheel cover imbalance.

On front-wheel-drive vehicles the front suspension should not be allowed to hang free. When the CV joint is run at a very high angle, extra vibrations can occur, as can damage to seals and joints. Always follow the equipment manufacturer's instructions.

When balancing on-vehicle, do not remove the balance weights from the off-vehicle dynamic balance. If more than one ounce of additional weight is required, it should be split between the inner and outer rim flanges.

NOTICE: The driven tire and wheel assemblies should be spun using the engine. Limit speed as stated in the following Caution.

CAUTION: Do not spin the drive wheels faster than 35 mph (55 km/h) as indicated by the speedometer. This limit is necessary because the speedometer indicates only one half of the actual wheel speed when one drive wheel is spinning and the other drive wheel is stopped. Personal injury and damage may result from high speed spinning.

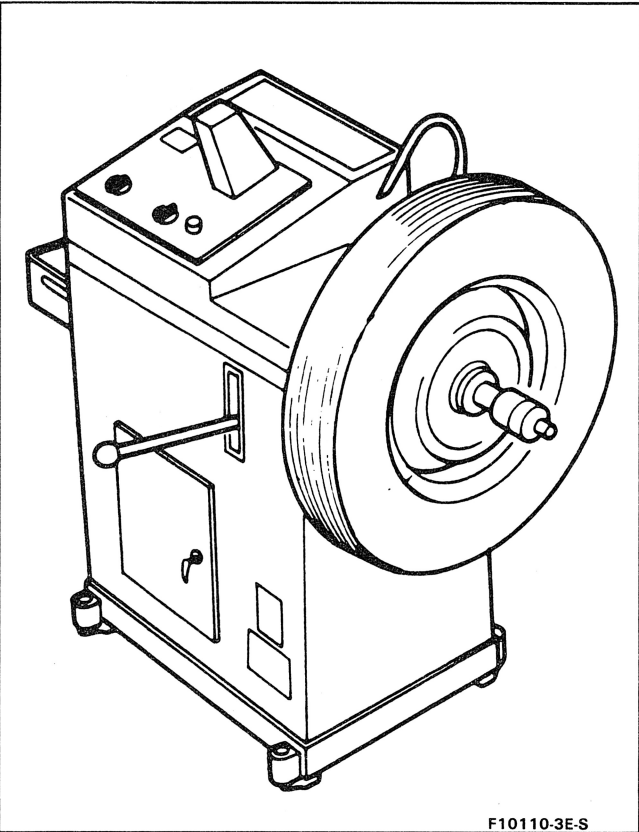


Figure 10 Off-Vehicle Balancing

Wheel Weights

When static balancing, if more than 85 grams (3.0 oz.) are needed, the wheel weights should be split as equally as possible between the inboard and outboard flanges.

CORRECTING NONUNIFORM TIRES

There are two ways to correct tires which cause a vibration even though they are properly balanced. One method uses an automatic machine which loads the tire and buffs small amounts of rubber from the stiff spots on the outer two tread rows. Corrections by this method are usually permanent and, if done properly, do not significantly affect the appearance or tire tread life. Tire truing for free runout with a blade-type machine is not recommended as this reduces the tread life substantially and often does not permanently correct the problem.

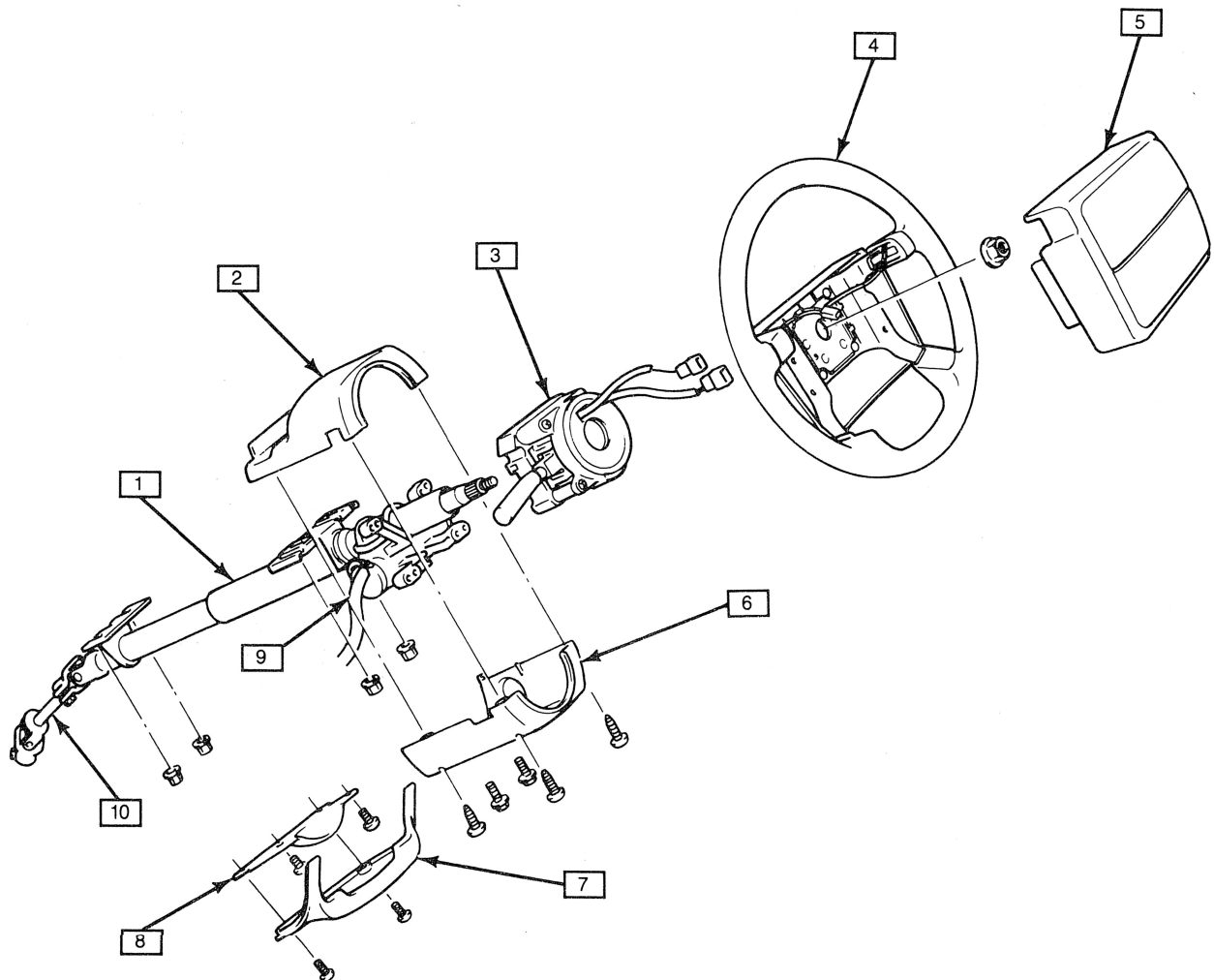
Another method is to dismount the tire and rotate it 180 degrees on the rim. It is important that this be done on tire and wheel assemblies which are known to be causing a vibration as it is just as likely to cause good assemblies to vibrate.

Refer to STEERING, SUSPENSION, TIRES AND WHEELS DIAGNOSIS (SEC.3) of the 1990 Geo Metro Service Manual for additional details.

SPECIFICATIONS

WHEEL NUT TORQUE

Wheel Nuts	60 N·m (44 lb.ft.)
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- 1 STEERING COLUMN
- 2 STEERING COLUMN UPPER TRIM COVER
- 3 SIR COIL AND TURN SIGNAL/DIMMER SWITCH ASSEMBLY
- 4 STEERING WHEEL
- 5 INFLATOR MODULE
- 6 STEERING COLUMN LOWER TRIM COVER
- 7 LOWER STEERING COLUMN TRIM PANEL
- 8 STEERING COLUMN REINFORCEMENT PLATE
- 9 IGNITION SWITCH
- 10 STEERING SHAFT JOINT

LC0003-3F4-MC-RS

Figure 3 SIR Steering Wheel and Column

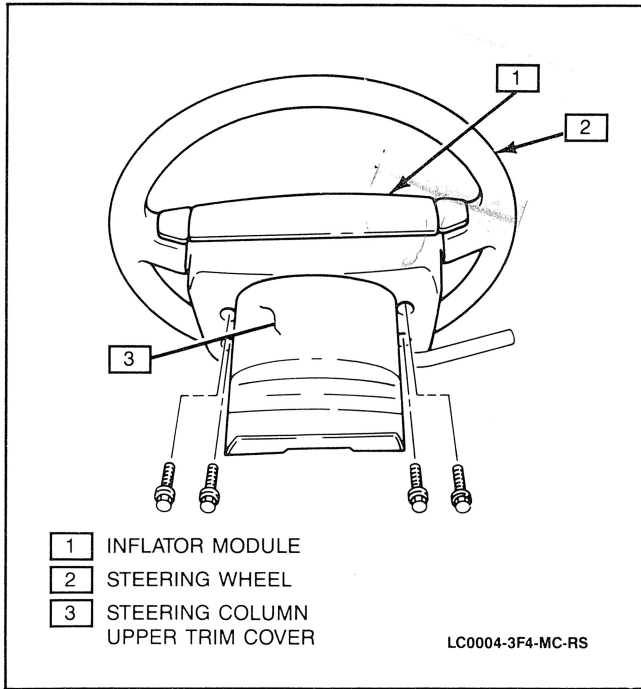


Figure 4 Inflator Module

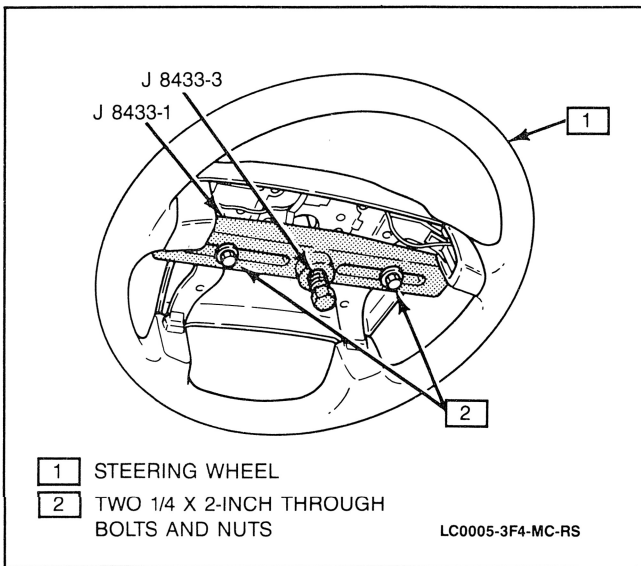


Figure 5 Steering Wheel Removal

1. Battery negative (-) cable.
2. Steering wheel. Refer to "Steering Wheel" earlier in this section.
3. SIR coil and turn signal/dimmer switch assembly. Refer to SUPPLEMENTAL INFLATABLE RESTRAINT STEERING COLUMN UNIT REPAIR (SEC.3F4A).
4. One screw and ignition switch from steering column.
5. Two screws and ignition key warning switch from steering column.
6. Electrical connectors; 2 from the fuse block and 1 from the SIR harness.
- Pull ignition switch harness free from I/P and remove from vehicle.

Install or Connect

1. Ignition switch harness to vehicle; route through I/P to fuse block.
2. Electrical connectors; 2 to the fuse block and 1 to the SIR harness.
3. Ignition key warning switch to steering column; secure with 2 screws.
4. Ignition switch to steering column; secure with 1 screw.
5. SIR coil and turn signal/dimmer switch assembly. Refer to SUPPLEMENTAL INFLATABLE RESTRAINT STEERING COLUMN UNIT REPAIR (SEC.3F4A).
6. Steering wheel. Refer to "Steering Wheel" earlier in this section.
7. Battery negative (-) cable.
- Enable the SIR system. Refer to "Enabling the SIR System" located under "Service Precautions" earlier in this section.

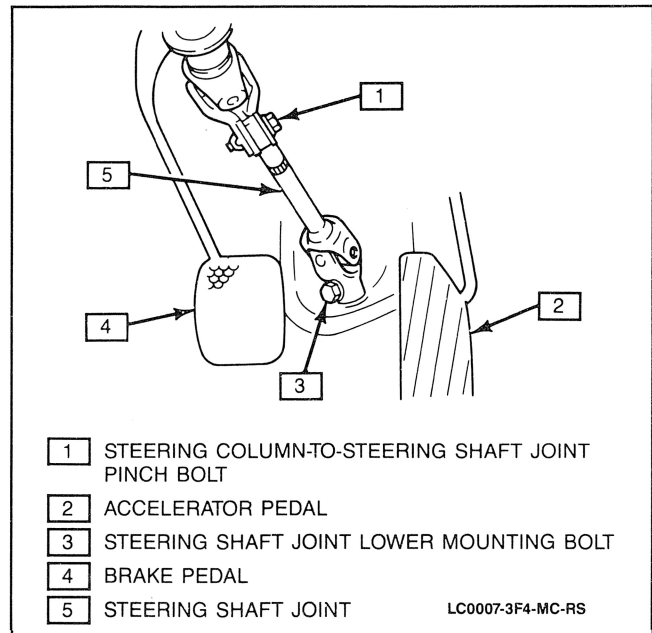


Figure 6 Steering Shaft Joint

STEERING SHAFT JOINT

Figures 6 and 7

Remove or Disconnect

- Set the front wheels in the straightforward position.
- 1. Steering shaft trim cover.
- 2. Steering column-to-steering shaft joint pinch bolt.
- 3. Steering shaft joint lower mounting bolt from pinion shaft.
- 4. Steering shaft joint from vehicle.

Install or Connect

1. Steering shaft joint to steering column. Align the flat part of the shaft joint with the pinch bolt hole on the steering column.

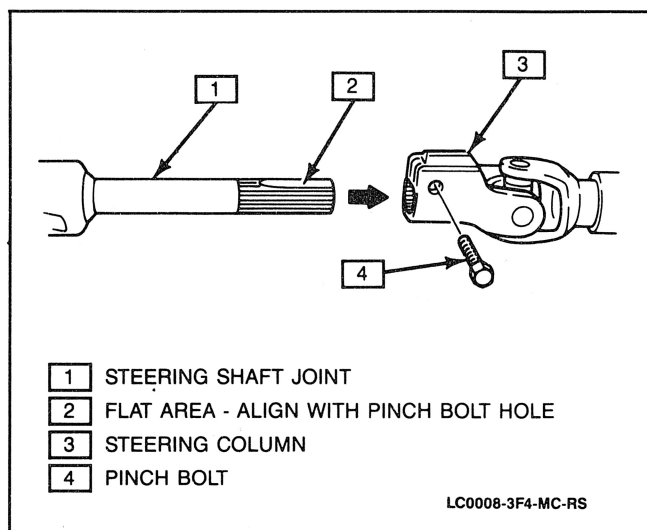


Figure 7 Steering Column-to-Steering Shaft Joint Mounting

- Steering column-to-steering shaft joint pinch bolt. Do not tighten.

! Important

- The vehicle's wheels must be in the straightforward position.

- Steering shaft joint to pinion shaft; secure with mounting bolt.

Tighten

- Steering column-to-steering shaft joint pinch bolt to 25 N·m (18 lb.ft.).
- Steering shaft joint lower mounting bolt to 25 N·m (18 lb.ft.).

- Steering shaft trim panel.

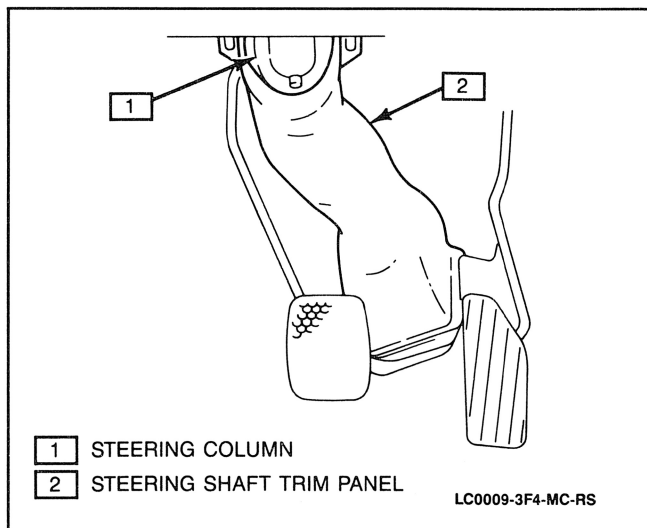


Figure 8 Steering Shaft Trim Panel

STEERING COLUMN

Figures 8 and 9

NOTICE: The steering column is extremely susceptible to damage once it has been removed from the vehicle. Dropping the column assembly

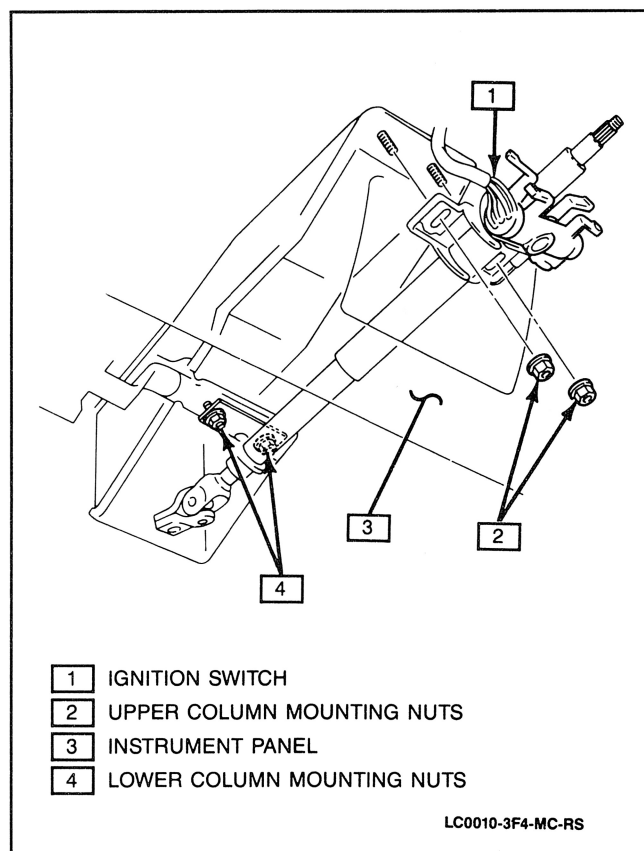


Figure 9 Steering Column

on its end could collapse the steering shaft or loosen plastic injections which maintain column rigidity. Leaning on the column could cause it to bend or deform. Any of the above damage could impair the column's collapsible design. If it is necessary to remove the steering wheel, use only the specified steering wheel puller. Under no conditions should the end of the shaft be hammered, as such action could loosen plastic injections, undermining the column's rigidity.

NOTICE: The vehicle's wheels must be in a straight-ahead position and the key must be in the "LOCK" position when removing or installing the steering column. Failure to do so may cause the SIR coil assembly to become uncentered and may result in unneeded SIR system repairs.

! Important

- In the event deployment has occurred, inspect the coil assembly wire for any signs of scorching, melting or other damage due to excessive heat. If the coil has been damaged, replace it.

NOTICE: The steering column should never be supported by only the lower support bracket—damage to the column lower bearing adapter could result.

↔ Remove or Disconnect

- Disable the SIR system. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.

1. Battery negative (-) cable.
2. Steering wheel. Refer to "Steering Wheel" earlier in this section.
3. Steering shaft trim panel.
4. Two screws and lower steering column trim panel.
5. Two screws and steering column reinforcement plate.
6. Steering column electrical connectors.
7. Brake transaxle shift interlock cable from ignition switch (automatic transaxle only). Refer to AUTOMATIC TRANSAXLE (SEC.7A) of the 1990 Geo Metro Service Manual.
8. Steering column-to-steering shaft joint pinch bolt.
9. Two upper and two lower column mounting nuts.
10. Steering column from vehicle.

Install or Connect

1. Steering column into vehicle, securing with lower mounting nuts. Do not tighten fully.
2. Upper steering column mounting nuts. Do not tighten fully.
3. Steering shaft joint to steering column; secure with pinch bolt.

Tighten

- Upper and lower steering column mounting nuts to 14 N·m (124 lb.in.).
 - Steering column-to-steering shaft joint pinch bolt to 25 N·m (18 lb.ft.).
4. Brake transaxle shift interlock cable to ignition switch (automatic transaxle only). Refer to AUTOMATIC TRANSAXLE (SEC.7A) of the 1990 Geo Metro Service Manual.
 5. Steering column electrical connectors.
 6. Steering column reinforcement plate, securing with 2 screws.
 7. Lower steering column trim panel; secure with 2 screws.
 8. Steering shaft trim panel.
 9. Steering wheel. Refer to "Steering Wheel" earlier in this section.
 10. Battery negative (-) cable.
- Enable the SIR system. Refer to "Enabling the SIR System" located under "Service Precautions" earlier in this section.

UNIT REPAIR

Refer to SUPPLEMENTAL INFLATABLE RESTRAINT STEERING COLUMN UNIT REPAIR (SEC.3F4A) for SIR steering column unit repair procedures.

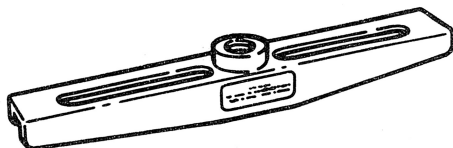
SPECIFICATIONS

FASTENER TORQUES

Inflator Module Retaining Screws	10 N·m (89 lb.in.)
Steering Wheel Retaining Nut	34 N·m (25 lb.ft.)
Steering Column Retaining Nuts	14 N·m (124 lb.in.)
Steering Column-to-Steering Shaft Joint Pinch Bolt	25 N·m (18 lb.ft.)
Steering Shaft Joint Lower Mounting Bolt	25 N·m (18 lb.ft.)

SPECIAL TOOLS


J 8433-1




J 8433-3



-  PULLER BAR
-  PULLER SCREW

SECTION 3F4A

SUPPLEMENTAL INFLATABLE RESTRAINT STEERING COLUMN UNIT REPAIR

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above conditions are not followed, parts or system damage could result.

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Centering the SIR Coil	3F4A-2
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Checking Steering Column for Accident Damage	3F4A-3

UNIT REPAIR

SIR COIL AND TURN SIGNAL/DIMMER SWITCH

Figures 1 and 2



Important

- In the event deployment has occurred, inspect the coil assembly wire for any signs of scorching, melting or other damage due to excessive heat. If the coil assembly is damaged, replace it.



Remove or Disconnect

NOTICE: Place the ignition switch in the "LOCK" position to prevent the SIR coil from becoming uncentered.

1. Battery negative (-) cable.
- Disable the SIR system and remove the steering wheel. Refer to **SUPPLEMENTAL INFLATABLE RESTRAINT STEERING WHEEL AND COLUMN (SEC.3F4)**.
2. Six screws retaining upper and lower steering column covers.
3. Steering column covers from steering column.
4. Four electrical connectors; 2 from the fuse block, 1 from the SIR harness and 1 from the main wire harness.
5. Four screws retaining SIR coil and turn signal/dimmer switch assembly.

6. Switch assembly from steering column.

NOTICE: Coil assembly will become uncentered if the steering column is separated from the steering gear and it is allowed to rotate. If the SIR coil becomes uncentered, refer to "Centering the SIR Coil" later in this section for centering procedures.

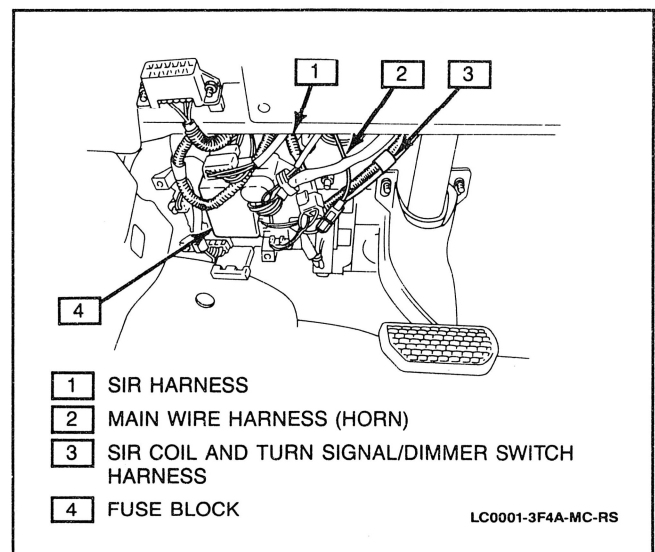


Figure 1 Lead Wire Connections



Install or Connect

1. SIR coil and turn signal/dimmer switch assembly to steering column; secure with four screws.

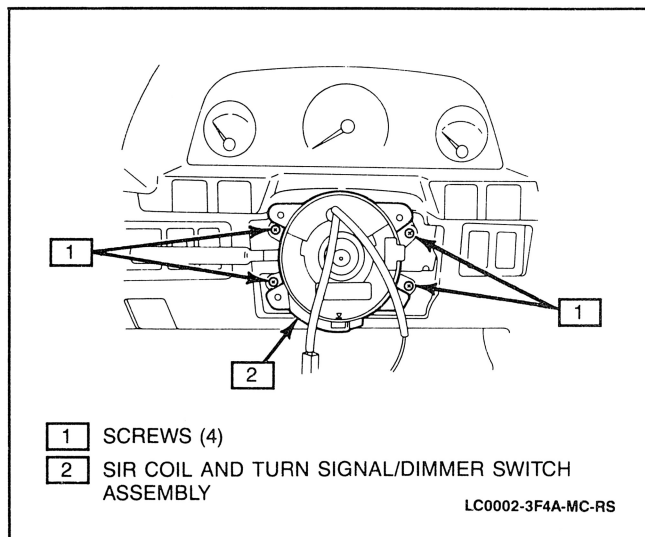


Figure 2 SIR Coil and Turn Signal/Dimmer Switch

Inspect

- The SIR coil to make sure that it is centered. If the SIR coil is not centered, refer to “Centering the SIR Coil” later in this section.
 - Route wires through the steering column and connect to the fuse block, SIR harness and main wire harness.
2. Upper and lower steering column covers; secure with 6 screws.
 3. Steering wheel and enable the SIR system. Refer to **SUPPLEMENTAL INFLATABLE RESTRAINT STEERING WHEEL AND COLUMN (SEC.3F4)**.
 4. Battery negative (-) cable.

CENTERING THE SIR COIL

Figure 3

1. Set the vehicle's wheels in the straightforward position.
2. Inspect the current state of the SIR coil.
 - If the “NEUTRAL” mark is at the alignment mark, the coil is centered and no further adjustment is necessary.
 - If the “R1” mark is found close to the alignment mark, the coil is one rotation off to the right from its center state and needs to be adjusted one turn counterclockwise. The “R2” mark means that the coil is two rotations off, etc.
 - If the “L1” mark is found close to the alignment mark, the coil is one rotation off to the left from its center state and needs to be adjusted one turn clockwise. The “L2” mark means that the coil is two rotations off, etc.
3. Remove the SIR coil and turn signal/dimmer switch assembly. Refer to “SIR Coil and Turn Signal/Dimmer Switch Assembly” earlier in this section.

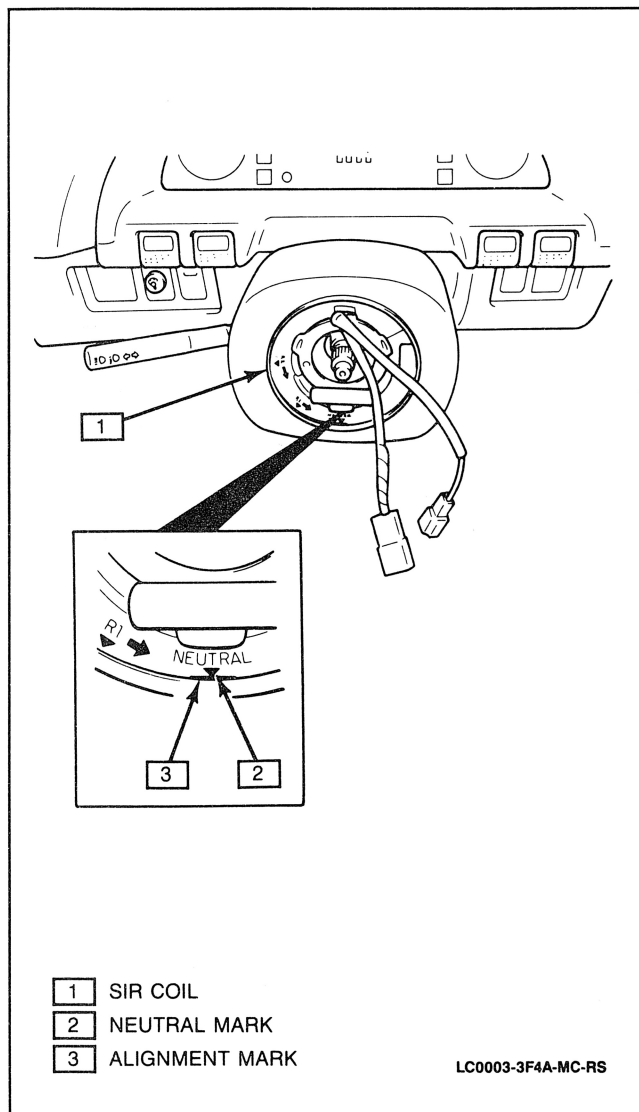


Figure 3 Centering the SIR Coil

4. To adjust the SIR coil, hold the coil lead at its base and turn it in the direction specified above.
5. Reinstall the SIR coil and turn signal/dimmer switch assembly to the steering column. Refer to “SIR Coil and Turn Signal/Dimmer Switch Assembly” earlier in this section.

STEERING COLUMN LOCK ASSEMBLY

Figures 4 and 5

Remove or Disconnect

- Disable the SIR system and remove the steering column from the vehicle. Refer to **SUPPLEMENTAL INFLATABLE RESTRAINT STEERING WHEEL AND COLUMN (SEC.3F4)**.
1. One screw and ignition switch from steering column.
 2. Two screws and ignition key warning switch from column.
- Using a center punch, loosen and remove two steering column lock retaining bolts.

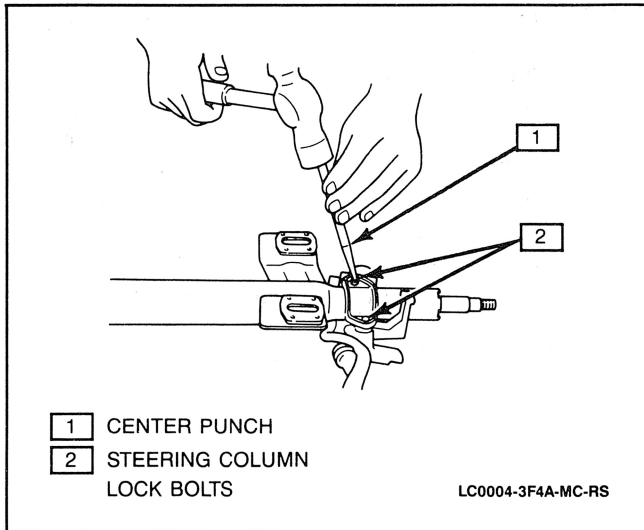


Figure 4 Removing Steering Column Lock Assembly

NOTICE: Use care not to damage the aluminum part of the steering column lock assembly body with the center punch.

- Turn the ignition key to “ACC” or “ON.”
3. Steering column lock assembly from steering column.

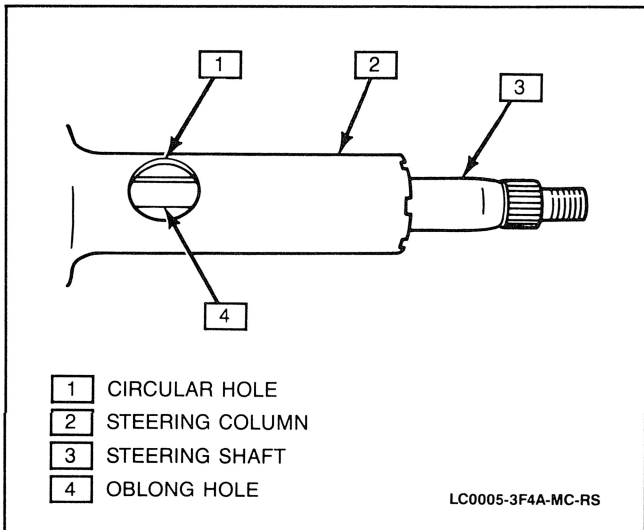


Figure 5 Centering Steering Column

Install or Connect

- Position oblong hole of steering shaft in the center of the circular hole in the steering column (Figure 5).
 - Turn the ignition key to “ACC” or “ON.”
1. Steering column lock assembly to steering column.
 - Turn the ignition key to “LOCK” and pull the key out.
 - Align hub on lock assembly with the oblong hole on the steering column. Rotate steering shaft to ensure that it is locked.
 2. Two new bolts securing steering column lock assembly. Tighten the new bolts until the bolt heads are broken off.

3. Ignition key warning switch; secure with 2 screws.
4. Ignition switch to steering column, securing with 1 screw.

Inspect

- Turn the ignition key to “ACC” or “ON” and inspect steering column operation. It should rotate smoothly. Also inspect column lock operation.
5. Steering column to vehicle and enable the SIR system. Refer to SUPPLEMENTAL INFLATABLE RESTRAINT STEERING WHEEL AND COLUMN (SEC.3F4).

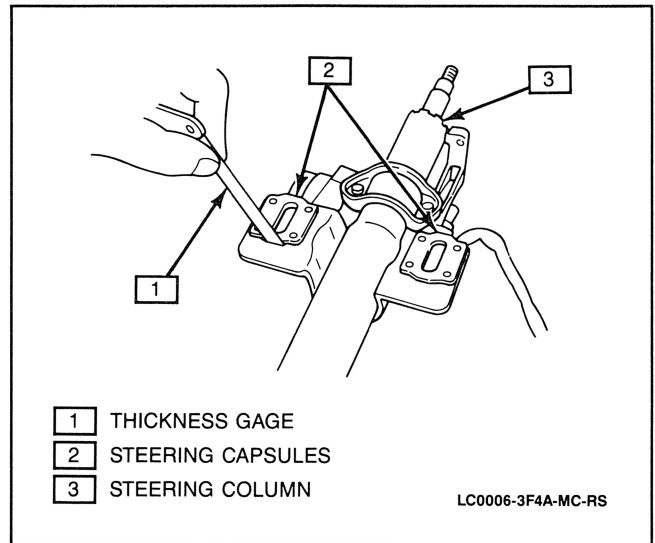


Figure 6 Checking Steering Column Capsules

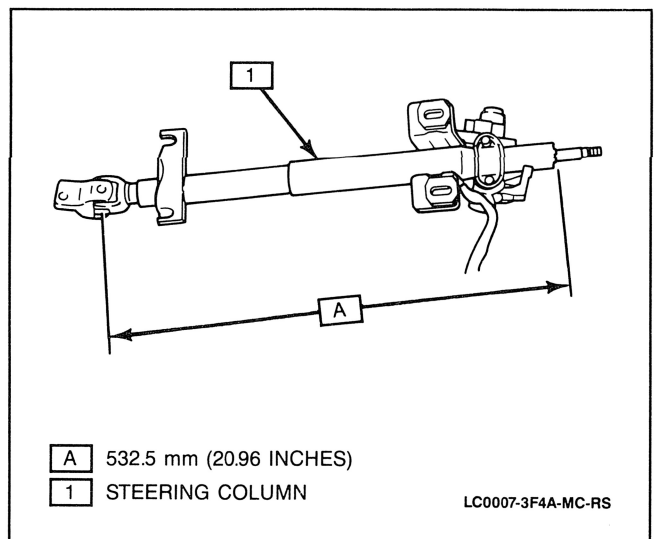


Figure 7 Steering Column Measurement

CHECKING STEERING COLUMN FOR ACCIDENT DAMAGE

Figures 6 and 7

NOTICE: Vehicles involved in accidents resulting in frame damage, major body or sheet metal damage, where the steering column has been

3F4A-4 SIR STEERING COLUMN UNIT REPAIR

impacted or where the Supplemental Inflatable Restraint System deployed may have damaged or misaligned steering columns.



Inspect

- Check capsules on steering column mounting bracket. They should be contacting the bottom of the slots. If not, replace steering column. Use a thickness gage for convenience (Figure 1).
- Measure the steering column assembly (Figure 2). If it is shorter than 532.5 mm (20.96 inches), replace the steering column.
- Check steering shaft joints and steering shaft for any damages such as cracks, breakage, malfunction or excessive play. If anything is found faulty, replace the steering shaft joint.
- Check the steering shaft for smooth operation. If found defective, replace the steering column.
- Check the steering shaft and column for bends, cracks or any deformation. If found defective, replace the steering column.

SECTION 5B

DISC BRAKE CALIPER

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in Section 9J under ON-VEHICLE SERVICE before performing service on or around SIR components or SIR wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above conditions are not followed, parts or system damage could result.

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(Carrier).....	5B-2	Fastener Torques	5B-4

GENERAL DESCRIPTION

The caliper is a single bore design and is mounted to a carrier assembly. Hydraulic pressure, created by applying the brake pedal, is converted by the caliper to a stopping force. This force acts equally against the piston and the bottom of the caliper bore to move the piston outward and to slide the caliper inward resulting in a clamping action on the rotor. This clamping action forces the linings against the rotor, creating the friction necessary to stop the vehicle.

ON-VEHICLE SERVICE

CAUTION: When servicing brake parts, do not create dust by grinding, sanding brake linings, or by cleaning brake parts with a dry brush or compressed air. Many brake parts contain asbestos fibers which can become airborne if dust is created during servicing. Breathing dust containing asbestos fibers may cause serious bodily harm. A water-dampened cloth or water-based solution should be used to remove any dust on brake parts. Equipment is commercially available to perform this washing function. These wet methods will prevent asbestos fibers from becoming airborne.

 Important

- Replace all components included in repair kits.
- Lubricate rubber parts with clean brake fluid to ease assembly.

- Do not use lubricated shop air on brake parts as damage to rubber components may result.
- If any hydraulic component is removed or disconnected, bleeding of the brake system is necessary. Refer to BRAKES (SEC.5) of the 1990 Geo Metro Service Manual.

CALIPER ASSEMBLY

Figure 1

 Remove or Disconnect

- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
1. Wheel. Refer to TIRES AND WHEELS (SEC. 3E).
 2. One bolt and flexible brake hose.
 - Place brake hose in a suitable container to catch brake fluid.
 3. Two caliper pin bolts.
 4. Caliper from carrier.

 Install or Connect

1. Caliper to carrier, securing with 2 pin bolts.

 Tighten

- Caliper pin bolts to 27 N·m (20 lb.ft.).
2. Flexible brake hose; secure with 1 bolt.

 Tighten

- Flexible brake hose bolt to 23 N·m (17 lb. ft.).

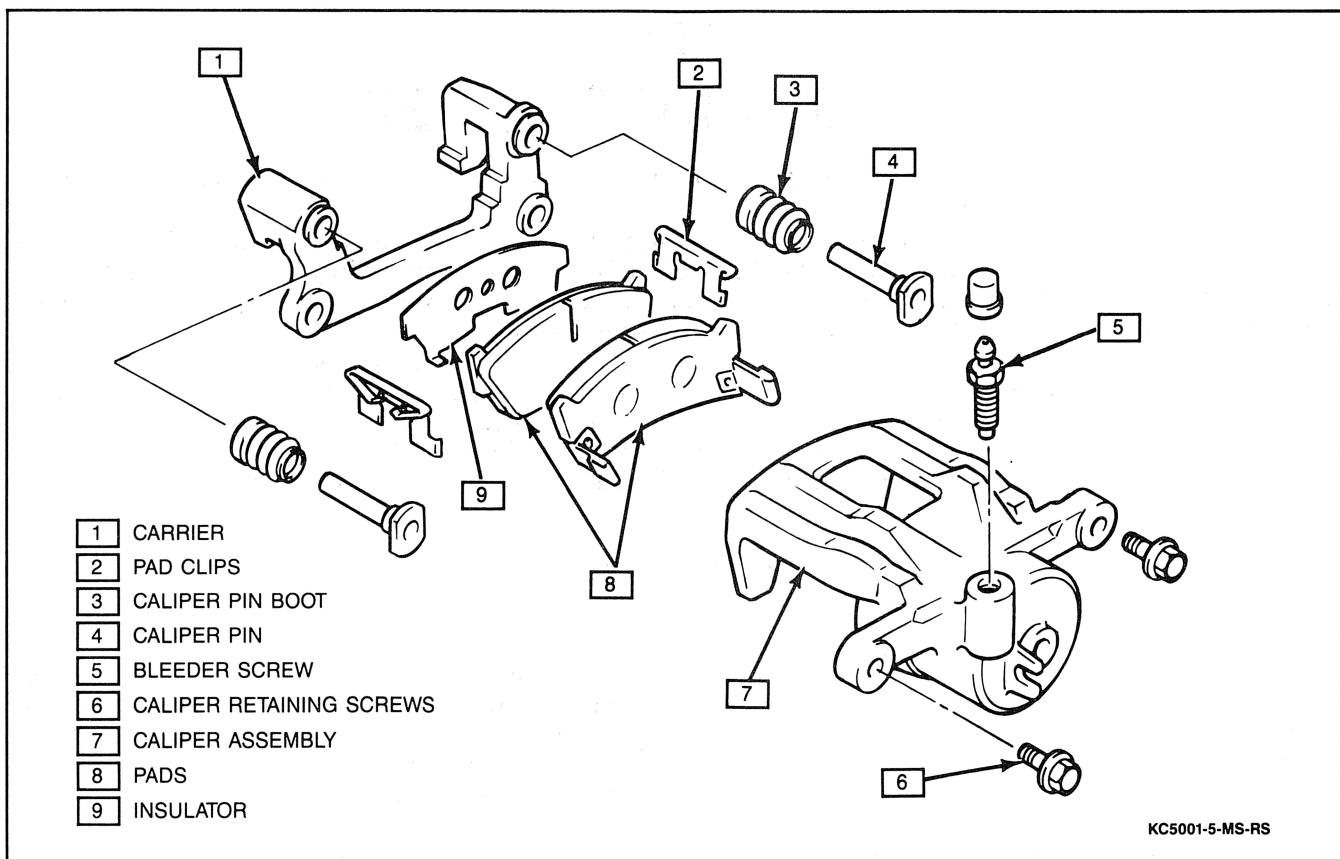


Figure 1 Caliper Assembly

3. Wheel. Refer to TIRES AND WHEELS (SEC. 3E).
- Bleed brakes. Refer to BRAKES (SEC.5) of the 1990 Geo Metro Service Manual.
- Lower vehicle.

SHOE AND LINING ASSEMBLIES (PADS)

Figure 1

Remove or Disconnect

- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
1. Wheel. Refer to TIRES AND WHEELS (SEC. 3E).
 2. Two caliper pin bolts.
 3. Caliper from carrier and hang with a wire hook to prevent damage to the flexible brake line.
 4. Pads from carrier.

Install or Connect

1. Pads to carrier; snap into place.
2. Caliper to carrier, securing with 2 pin bolts.

Tighten

- Caliper pin bolts to 27 N·m (20 lb.ft.).
3. Wheel. Refer to TIRES AND WHEELS (SEC. 3E).
 - Lower vehicle.

CALIPER MOUNTING BRACKET (CARRIER)

Figure 1

Remove or Disconnect

- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
1. Wheel. Refer to TIRES AND WHEELS (SEC. 3E).
 2. Two caliper pin bolts.
 3. Caliper from carrier and hang from a wire hook to prevent damage to the flexible brake line.
 4. Two bolts and carrier from steering knuckle.
 5. Pads from carrier (if needed).

Install or Connect

1. Pads to carrier (if needed).
2. Carrier to steering knuckle; secure with 2 bolts.

Tighten

- Carrier-to-knuckle bolts to 85 N·m (63 lb. ft.).
3. Caliper to carrier; secure with 2 pin bolts.

Tighten

- Caliper pin bolts to 27 N·m (20 lb.ft.).
4. Wheel. Refer to TIRES AND WHEELS (SEC. 3E).
 - Lower vehicle.

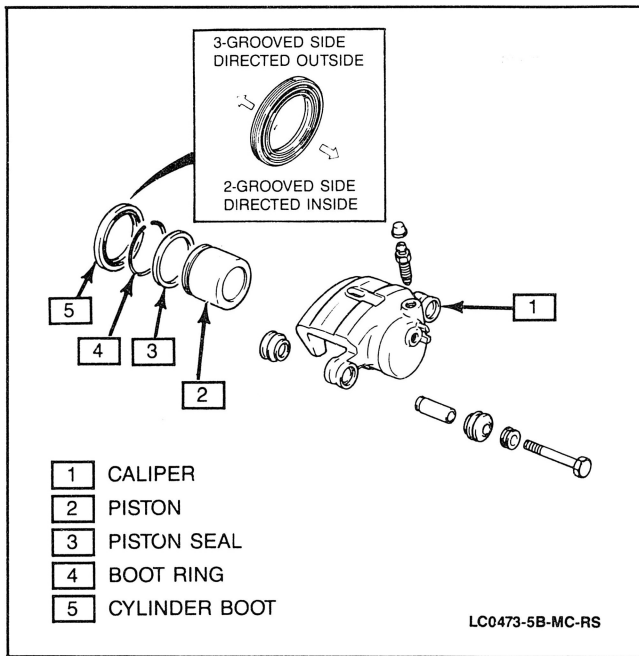


Figure 2 Caliper Piston Assembly

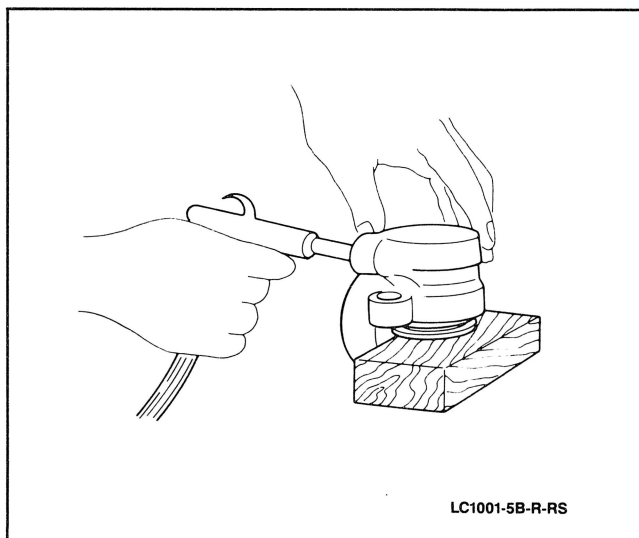


Figure 3 Removing Piston

UNIT REPAIR

CALIPER OVERHAUL

Figures 2 and 3

Remove or Disconnect

1. Caliper assembly from vehicle. Refer to "Caliper Assembly" earlier in this section.

Clean

- Caliper assembly with brake fluid.
2. Cylinder boot set ring and boot from cylinder groove.
 3. Piston from caliper using compressed air directed into the caliper inlet hole. Use a block of wood to pad the interior of the caliper housing during piston removal.

CAUTION: Do not place fingers in front of the piston in an attempt to catch or protect it when applying compressed air. The piston can develop sufficient speed to cause serious injury.

NOTICE: Use just enough air to ease the piston out of the bore. If the piston is blown out, even with padding, it may be damaged.

4. Piston seal from caliper housing.

Clean

- Caliper housing and pin bolts in clean denatured alcohol.
- Dry with unlubricated compressed air.
- Blow out all passages in the caliper housing and bleeder valve.

Inspect

- Caliper housing, carrier, piston, piston seal and boot for damage, wear or corrosion. Replace components as required.

Install or Connect

- Lubricate all rubber parts with clean brake fluid.
1. Piston seal and piston into caliper housing.
 2. Piston boot and set ring.

Important

- When installing boot to cylinder, position outer end of piston so that it projects out of the cylinder by 10 mm (0.4-inch). This will facilitate installation.
 - Be sure that the dust boots are secured firmly into each caliper groove.
3. Caliper assembly to vehicle. Refer to "Caliper Assembly" earlier in this section.

MOUNTING BRACKET REPAIR

The caliper mounting bracket (carrier) is not repairable. Service is by replacement only.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Brake Pad Thickness

Standard	15 mm (0.59-inch)
Limit	8mm (0.32-inch)

FASTENER TORQUES

Caliper Pin Bolts.....	27 N·m (20 lb.ft.)
Flexible Brake Hose Bolt	23 N·m (17 lb.ft.)
Carrier-to-Knuckle Bolts	85 N·m (63 lb.ft.)

SECTION 8A

ELECTRICAL DIAGNOSIS

Geo METRO CONVERTIBLE

CELL

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Daytime Running Lamps		Hazard Switch	8A-12-0*	Washer Pump	
Controller	8A-104-1	High-Mounted Stoplamp	8A-14-2*	(See also Front Washer Pump)	8A-14-3*
Daytime Running Lamps		Horn	8A-14-3*	Wiper Motor	
Resistor	8A-104-1	Horn Relay	8A-10-0*	(See also Front Wiper Motor)	8A-11-0*
Diagnostic Energy Reserve Module		Ignition Coil	8A-11-5*	Wiper/Washer Switch	
(DERM)	8A-47-0	Ignition Key Warning Switch	8A-76-0	(See also Front Washer/	
Diagnostic Lamp	8A-11-5	Ignition Switch	8A-30-0	Wiper Switch)	8A-11-7*
Diagnostic Switch	8A-14-1*	Illumination Controller	8A-114-1		

BLANK

ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES

All ESD sensitive components contain Solid State circuits. The following information applies to all ESD sensitive devices. The ESD symbol (Figure 1) is used on schematics (Figure 2) to indicate which components are ESD sensitive.

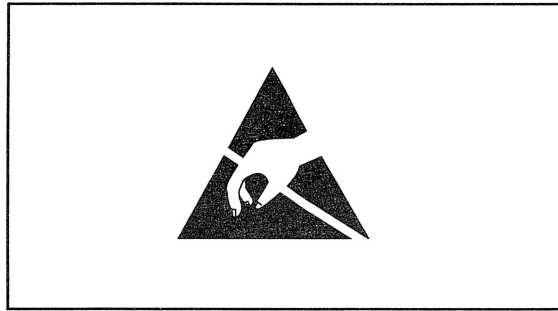


Figure 1 - Electrostatic Discharge (ESD) Sensitive Device Symbol

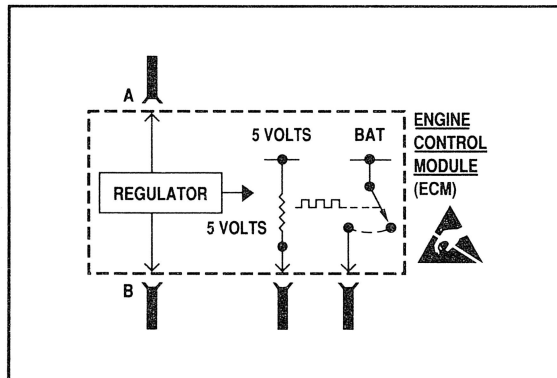


Figure 2 - Component (on Schematic) Indicated as ESD Sensitive

HANDLING PROCEDURES

When handling an electronic part that is ESD sensitive (see Figure 1), the service technician should follow these guidelines to reduce any possible electrostatic charge build-up on the service technician's body and the electronic part in the dealership:

1. Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across the seat, sitting down from a standing position or walking a distance.
2. Avoid touching electrical terminals of the part, unless so instructed by a written diagnostic procedure.
3. Do not open package of a new part until it is time to install the part.
4. Before removing the part from its package, ground the package to a known good ground on the car.

MEASURING PROCEDURES

1. Solid State circuits in electronic devices are shown greatly simplified.
2. Due to the simplification of the electronic devices on the schematics, resistance measurements could be misleading or could lead to electrostatic discharge.
3. Only measure the resistance at the terminals of these devices when instructed by a written diagnostic procedure.

4. When using a voltmeter, be sure to connect the ground lead first.

JUMP STARTING IN CASE OF EMERGENCY WITH AUXILIARY (BOOSTER) BATTERY

For jump starting procedures, refer to BATTERY (SEC.6D1).

TROUBLESHOOTING PROCEDURES

The following four-step troubleshooting procedure is recommended:

Step 1: Check the Problem

Perform the System Diagnosis to be sure you understand what's wrong. Don't waste time fixing part of the problem! Do not begin disassembly or testing until you have narrowed down the possible causes.

Step 2: Read the Electrical Schematic

Study the schematic. Read the Circuit Operation text if you do not understand how the circuit *should* work. Check circuits that share wiring with the problem circuit. The names of circuits that share the same fuse, ground, switch, etc., are included on each electrical schematic. (Shared circuits are also shown on Power Distribution, Ground Distribution, Fuse Block Details, and Light Switch Details pages.) Try to operate the shared circuits. If the shared circuits work, then the shared wiring is OK. The cause must be within the wiring used only by the problem circuit. If several circuits fail at the same time, chances are the power (fuse) or ground circuit is faulty.

Step 3: Find the Cause and Repair

- Narrow down the possible causes.
- Use the Troubleshooting Hints.

- Make the necessary measurements.
- Before you replace a component, check power, signal, and ground wires at the component harness connector. If these check OK, the component must be bad.

Step 4: Test the Repair

Repeat the System Diagnosis to be sure you have fixed the whole problem.

Example

A customer brings in a car and says that the high beams do not work.

Step 1: Perform the System Diagnosis on the headlamp circuit. You may discover that both low beams operate. In "HI," you may notice that the HIGH BEAM INDICATOR comes on, but neither high-beam operates.

Step 2: Read the Headlights electrical schematic (Figure 3). This is the step that will save you time and labor. Remember, it is essential to understand how a circuit should work, before trying to figure out why it doesn't.

After you understand how the circuit should operate, read the schematic again, this time keeping in mind what you have learned by operating the circuit.

Since both low beams work, you know that the LIGHT SWITCH, the YEL wire, the "LO" contacts of the HEADLAMP DIMMER SWITCH, terminal 1E of C100, the TAN wires, and grounds G105 and G109 are all good.

Furthermore, since you saw that the HIGH BEAM INDICATOR came on when the HEADLAMP DIMMER SWITCH was moved to "HI," you know that the "HI" contacts of the dimmer switch and the LT GRN wire between the dimmer switch and terminal 2E of C100 are good.

At this point, you could test for voltage at the RH HEADLAMP with the dimmer switch in "HI." However, it is extremely unlikely that the high beam filaments have burned out in *both* headlamps, or that *both* headlamp connections are bad. The cause must be a bad connection at C100, or a break in the LT GRN wire between C100 and the RH HEADLAMP.

You have quickly narrowed the possible causes down to one specific area, and have *done absolutely no* work on the car itself.

Step 3: Find the cause and repair it. Using the Component Location list and the corresponding figure, you can find C100 and the LT GRN wire, locate the exact trouble point, and make the repair.

Step 4: Check the repair by performing a system check on the Headlamps circuit. This, of course, means making sure that both high beams, both low beams, and the HIGH BEAM INDICATOR are all working.

Now suppose that the symptoms were different. You may have operated the Headlamps and found that the low beams were working, but neither the high beams nor the HIGH BEAM INDICATOR were working. Looking at the schematic, you might conclude the following:

It is unlikely that both high beam filaments and the HIGH BEAM INDICATOR have all burned out at once. The cause is probably the dimmer switch or its connector.

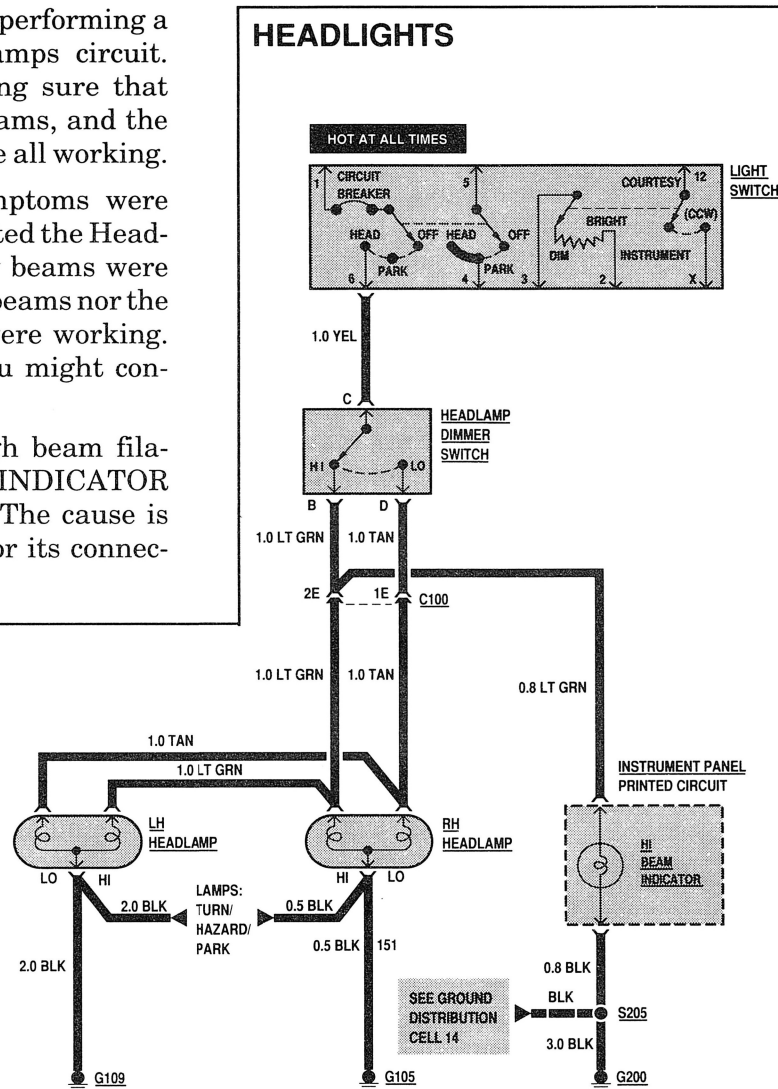


Figure 3 - Typical Headlamp Schematic

Electrical troubleshooting requires the use of common electrical test equipment.

TEST LIGHT/VOLTMETER

Use a test light to check for voltage. A J 34142-B test light is made up of a 12-Volt light bulb with a pair of leads attached. After grounding one lead, touch the other lead to various points along the circuit where voltage should be present. When the bulb goes on, there is voltage at the point being tested.

A voltmeter can be used instead of a test light. While a test light shows whether or not voltage is present, a voltmeter indicates how much voltage is present.

An increasing number of circuits include solid state control modules. One example is the Engine Control Module (ECM) used with Computer Command Control and Electronic Fuel Injection. Voltages in these circuits should be tested only with a 10-megohm or higher impedance digital voltmeter or multimeter. Never use a test light on circuits that contain solid state components, since damage to these components may result.

When testing for voltage or continuity at a connection, you do not have to separate the two halves of the connector. Unless you are testing a sealed, weather-tight connector, you should probe the connector from the back. Always check both sides of the connector. An accumulation of dirt and corrosion between contact surfaces is sometimes a cause of electrical problems.

TROUBLESHOOTING TOOLS

SELF-POWERED TEST LIGHT

Use a J 21008-A self-powered test light to check for continuity. This tool is made up of a light bulb, battery, and two leads. If the leads are touched together, the bulb will go on.

A self-powered test light is used only on an unpowered circuit (Figure 4). First disconnect the car's battery, or remove the fuse which feeds the circuit you're working on. Select two specific points along the circuit through which there should be continuity. Connect one lead of self-powered test light to each point. If there is continuity, the test light's circuit will be completed and the bulb will go on.

Never use a self-powered test light on circuits that contain solid state components, since damage to these components may result.

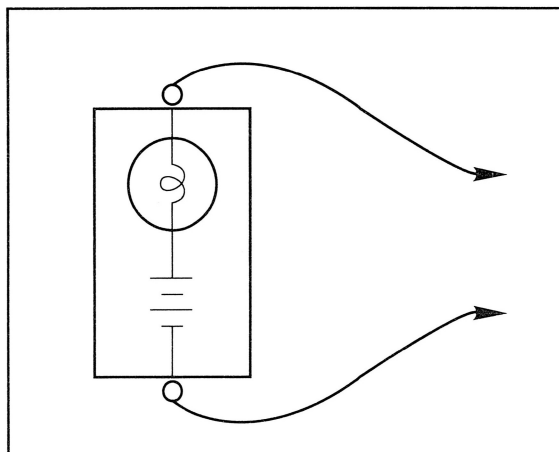


Figure 4 - Self-Powered Test Light

OHMMETER

An ohmmeter can be used instead of a self-powered test light. The ohmmeter shows how much resistance there is between two points along a circuit. Low resistance means good continuity.

Circuits which include any solid state control modules, such as the Engine Control Module (ECM), should be tested only with a J 34029-A 10-megohm or higher impedance digital multimeter.

When measuring resistance with a digital multimeter, the vehicle battery should be disconnected. This will prevent incorrect readings. Digital meters apply such a small voltage to measure resistance that the presence of voltages can upset a resistance reading.

Diodes and solid state components in a circuit can cause an ohmmeter to give a false reading. To find out if a component is affecting a measurement, take a reading once, reverse the leads and take a second reading. If the readings differ, the diode or solid state component is affecting the measurement.

FUSED JUMPER WIRE

A jumper wire is made up of an in-line fuse holder connected to a set of test leads (Figure 5). Use it for bypassing open circuits. Never use a jumper wire across any load (motors, etc.). This direct battery short will blow the fuse.

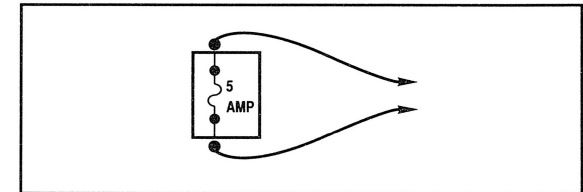


Figure 5 - Fused Jumper Wire

A J 36169 fused jumper is available with small clamp connectors providing adaptation to most connectors without damage.

NOTICE: This fused jumper wire is supplied with a 20 amp fuse which may not be suitable for some circuits. Do not use a fuse with a higher rating than the fuse that protects the circuit being tested. Do not use the fused jumper wire in any instance to substitute for inputs or outputs at the ECM or any other microprocessor device.

SHORT CHECKER

A J 8681-A universal short checker is available to locate hidden shorts to ground. The short finder creates a pulsing magnetic field in the shorted circuit and shows you the location of the short through body trim or sheet metal.

AUTO FUSE TESTER AND REMOVER/INSTALLER

A J 34764 tester that indicates a blown fuse is available. To check a fuse the tester is applied directly to the fuse in the fuse block. Two probes contact the fuse, either to the slots of a flat fuse or to the metal ends of

a glass fuse. With power on, a red LED in the tester lights if the fuse is open. The handle of the tester is a tool for removing either type of fuse.

TROUBLESHOOTING TESTS

TESTING FOR CONTINUITY

1. Disconnect the battery negative (-) cable.
2. Connect one lead of a self-powered test light or ohmmeter to one end of the part of the circuit you wish to test.
3. Connect the other lead to the other end of the circuit (Figure 6).
4. If the self-powered test light glows, there is continuity. If you are using an ohmmeter, low or no resistance means good continuity.

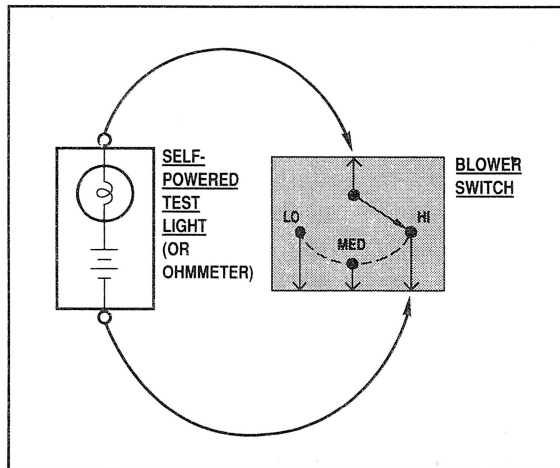


Figure 6 - Continuity Check Through a Switch

TESTING FOR VOLTAGE

1. Connect one lead of a test light to a known good ground. If you are using a voltmeter, be sure it is the voltmeter's negative (-) lead that you have connected to ground.
2. Connect the other lead of the test light or voltmeter to a selected test point (connector or terminal) where you would expect battery voltage (Figure 7).

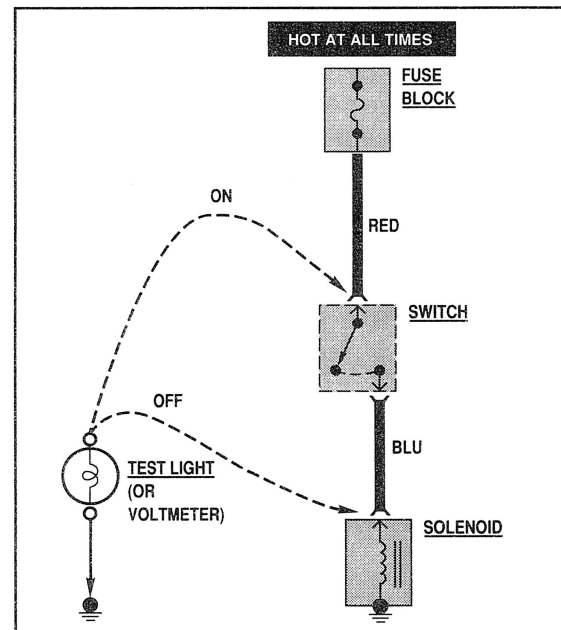


Figure 7 - Voltage Check

3. If the test light glows, there is voltage present. If you are using a voltmeter, note the voltage reading. It should be within one volt of measured battery voltage. A loss of more than one volt indicates a problem.

TESTING FOR VOLTAGE DROP

This test checks for voltage being lost along a wire, or through a connection or switch.

1. Connect the positive (+) lead of a voltmeter to the end of the wire (or to one side of the connection or switch) which is closer to the battery.
2. Connect the negative (-) lead to the other end of the wire (or the other side of the connection or switch).
3. Operate the circuit (Figure 8).
4. The voltmeter will show the difference in voltage between the two points. A difference (or drop) of more than one volt indicates a problem.

TROUBLESHOOTING TESTS

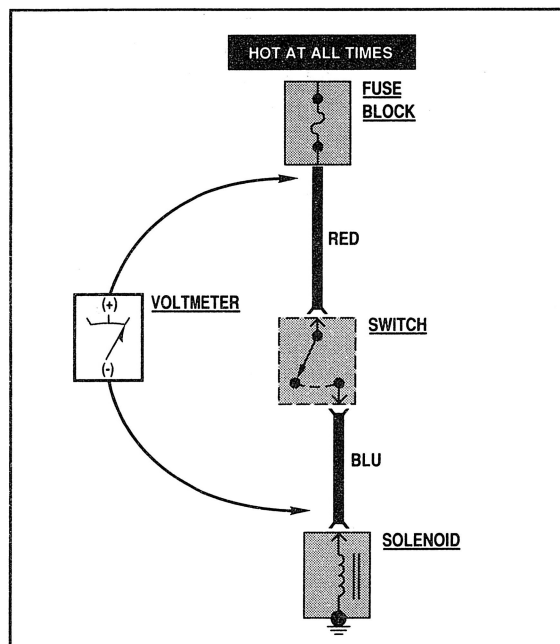


Figure 8 - Voltage Drop Test

TESTING FOR SHORT TO GROUND

With a Test Light or Voltmeter

1. Remove the blown fuse and disconnect the load.
2. Connect a test light or voltmeter across the fuse terminals (be sure that the fuse is powered).
3. Beginning near the fuse block, wiggle the harness from side to side. Continue this at convenient points while watching the test light or voltmeter.
4. When the test light glows, or the voltmeter registers, there is a short to ground in the wiring near that point (Figure 9).

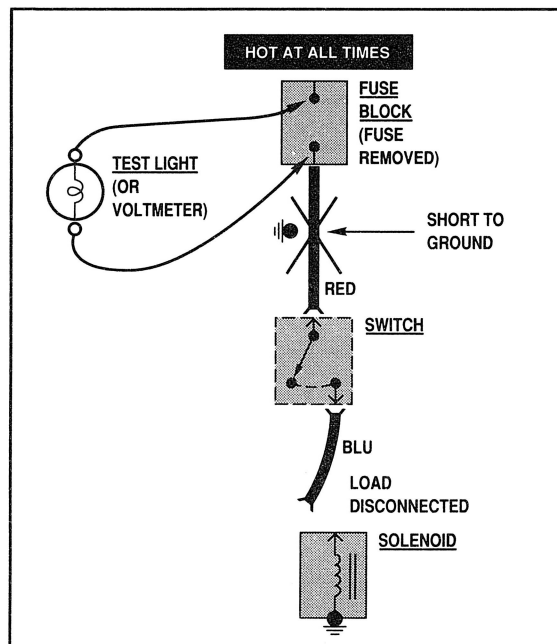


Figure 9 - Testing for Short with Test Light or Voltmeter

With a Self-Powered Test Light or Ohmmeter

1. Remove the blown fuse and disconnect the battery and load.
2. Connect one lead of a self-powered test light or ohmmeter to the fuse terminal on the load side.
3. Connect the other lead to a known good ground (Figure 10).
4. Beginning near the fuse block, wiggle the harness from side to side. Continue this at convenient points while watching the self-powered test light or ohmmeter.

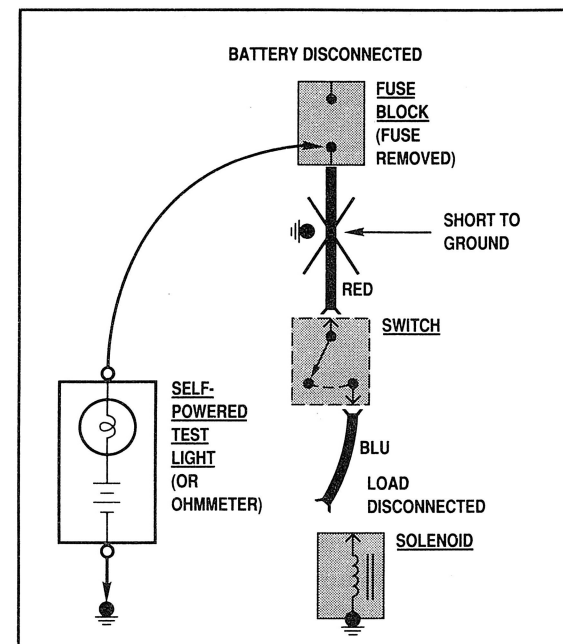


Figure 10 - Testing for Short with Self-Powered Test Light or Ohmmeter

5. When the self-powered test light glows or the ohmmeter registers, there is a short to ground in the wiring near that point.

With a Universal Short Checker

1. Remove the blown fuse, leaving the battery connected.
2. Connect the J 8681-A short checker across the fuse terminals.
3. Close all switches in series with the circuit you are troubleshooting.
4. Operate the short checker. The short checker will pulse current to the short.

TROUBLESHOOTING TESTS

This creates a pulsing magnetic field surrounding the circuit wiring between the fuse block and the short.

5. Beginning at the fuse block, slowly move the short checker's meter along the circuit wiring (Figure 11). The meter will show current pulses through sheet metal and body trim. As long as the meter is between the fuse block and the short, the needle will move with each current pulse. When you have moved the meter past the point of the short, the needle will stop moving. Examine the wiring in that area for the short to ground.

Fuses Powering Several Loads

1. Find the schematic in Fuse Block Details (CELL 11) for the fuse that has blown.
2. Open the first connector or switch leading from the fuse to each load.
3. Connect a test light across the fuse terminals.
 - If the test light glows, the short is in the wiring leading to the first connector or switch. Use the methods described above to pinpoint the location of the short.
 - If the test light does not glow, proceed to Step 4.
4. Close each connector or switch until the fuse blows to find which circuit the short is in. Connect test lamps, meter, or short checker at the connector to the suspect circuit (disconnected) rather than at the fuse terminals.

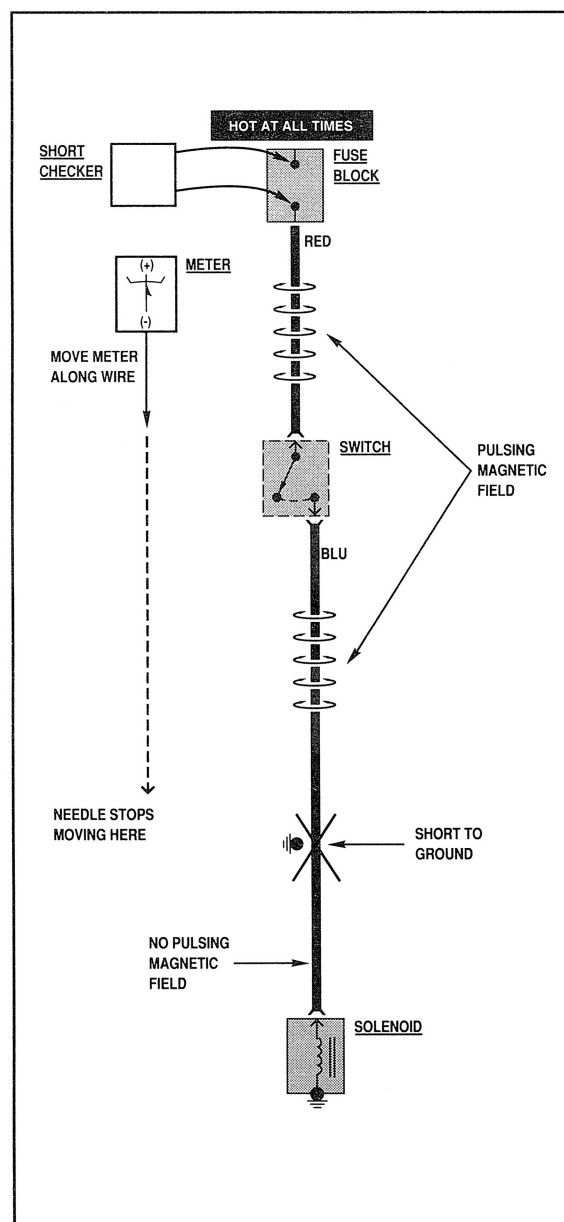


Figure 11 - Finding Short with Short Finder

TESTING FOR CURRENT

To test for current, the meter must be connected in series in the circuit. Current measurements always involve a component being removed or disconnected from the circuit. The circuit current flows through the meter, which displays the current in amps or milliams.

NOTICE: Never use a meter set on a current scale to measure voltage. Severe damage to the meter, the circuit or both will result.

Two commonly used locations for taking current measurements are at a fuse and at the battery.

To measure current in a WIPER MOTOR, for instance, the meter should be connected across the fuse terminals, after removing the fuse (Figure 12). The meter can be inserted in any circuit where a single circuit can be temporarily opened to make the measurement. A second example, measuring at a fusible link is illustrated in Figure 13.

The meter should be connected between the screw terminal and the fusible link ring tongue terminal, after disconnecting the link.

A special use of current measurement is the case of a car whose battery goes dead with no explanation. Normally current flow from the battery with the key "OFF" should be less than 50 milliams. By disconnecting the battery positive (+) cable and connecting your current meter between the positive

TROUBLESHOOTING TESTS

(+) cable and battery positive (+) terminal you can measure this current. If the current is greater than 50 milliamps, it will be necessary to check every fuse and fusible link as described above. Any circuits that have high current flow should be investigated.

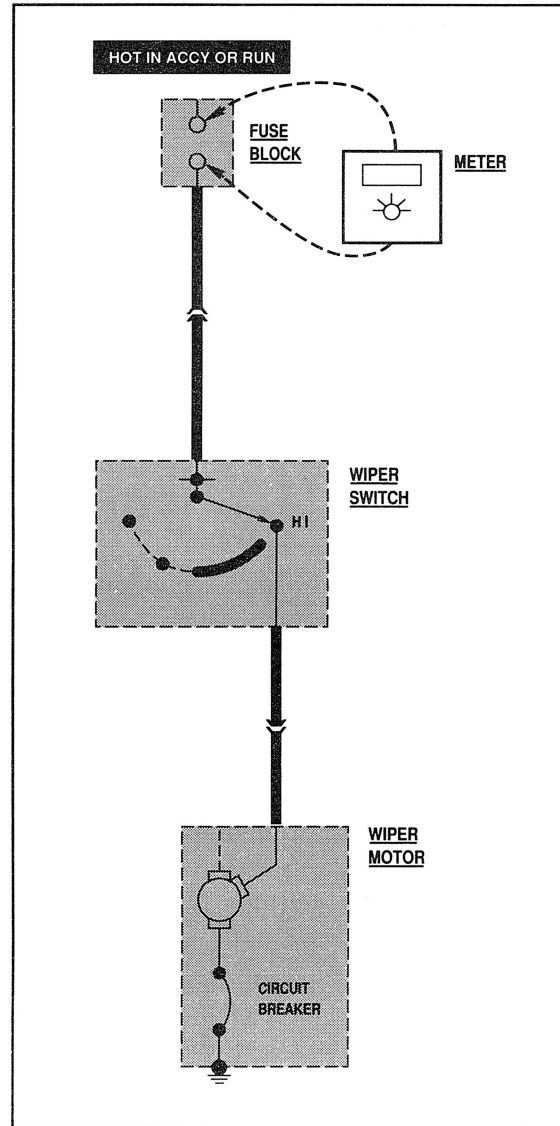


Figure 12

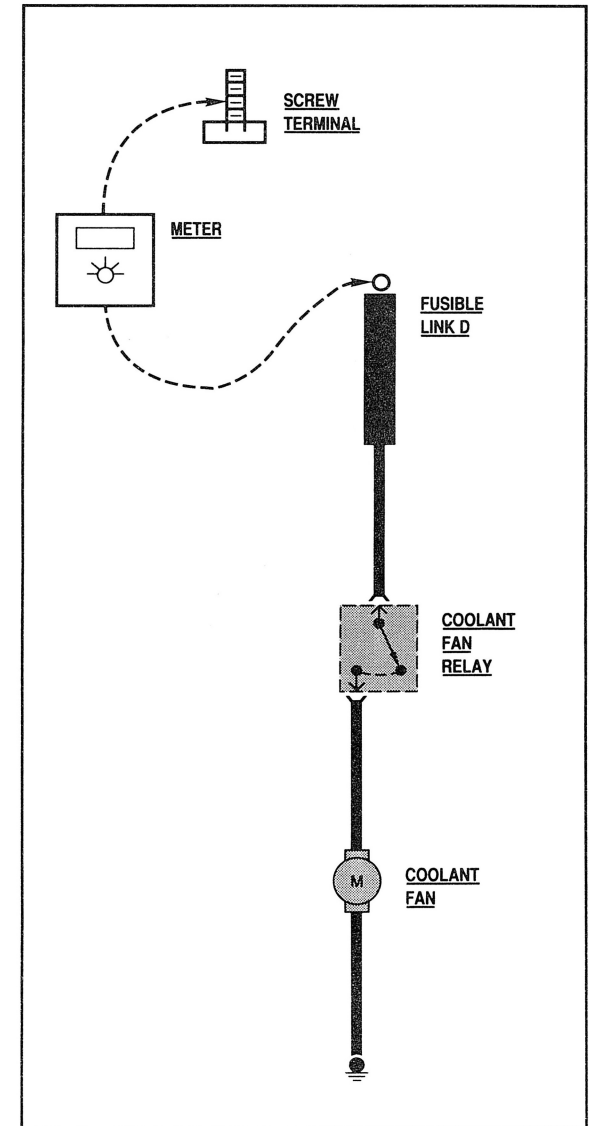


Figure 13

REPAIR PROCEDURES

ELECTRICAL REPAIRS

This section provides instruction in the following repairs:

- Circuit Protection
- Typical Electrical Repairs
- Splicing Copper Wire
- Splicing Aluminum Wire
- Splicing Twisted/Shielded Cable
- Repairing Connectors

NOTE: After any electrical repair is made, always test the circuit by operating the devices in the circuit. This confirms not only that the repair is correct, but also that the cause of the complaint was correctly identified.

CIRCUIT PROTECTION

All electrical circuits are protected against excessive loads which might occur because of shorts or overloads in the wiring system. Such protection is provided by a fuse, circuit breaker, or fusible link.

Fuses

The most common method of automotive wiring circuit protection is the fuse. Whenever there is an excessive amount of current flowing through a circuit, the fusible element will melt and create an open or incomplete circuit (Figure 1). Fuses are a "one-time" protection device and must be replaced each time the circuit is overloaded.

Auto-fuses are color coded. The standardized color identification and ratings are shown (Figure 2).

For service replacement, non-color coded fuses of the same respective current rating can be used. The current rating of each fuse is molded into its head.

To determine whether or not an auto-fuse is blown, remove the suspect fuse and examine the element in the fuse for a break (Figure 1). If the element is broken, replace the fuse with one of equal current rating.

There are, however, additional specific circuits with in-line fuses. In-line fuses are located within the individual wiring harnesses. They are usually housed in spring-loaded, twist-type receptacles.

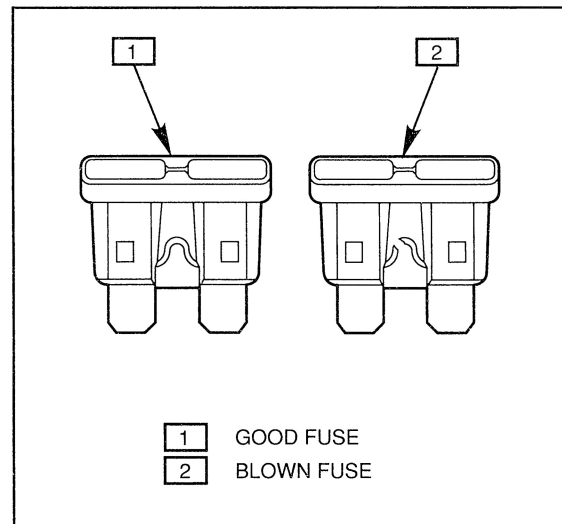


Figure 1 - Sample Fuses

CURRENT RATING (AMPERES)	COLOR
3	VIOLET
5	TAN
7.5	BROWN
10	RED
15	BLUE
20	YELLOW
25	WHITE
30	GREEN

Figure 2 - Fuse Rating and Color

Circuit Breakers

A circuit breaker is a protective device designed to open the circuit when a current load is in excess of rated breaker capacity. If there is a short or other type of overload condition in the circuit, the excessive current will open the circuit between the circuit breaker terminals. The circuit breaker will remain open until the trouble is found and corrected. The circuit breaker will close automatically when the excessive current is removed. The condition of a circuit breaker may be verified by removing it from the circuit and checking the resistance. A good circuit breaker will have less than 1.0 ohm resistance between the two terminals.

REPAIR PROCEDURES

Fusible Links

In addition to circuit breakers and fuses, some circuits use fusible links to protect the wiring. Like fuses, fusible links are “one-time” protection devices that will melt and create an open circuit (Figure 3).

Not all fusible link open circuits can be detected by observation. Always inspect that there is battery voltage past the fusible link to verify continuity.

Fusible links are used instead of a fuse in wiring circuits that are not normally fused, such as the ignition circuit. Each fusible link is four wire-gage sizes smaller than the cable it is designed to protect. Links are marked on the insulation with wire-gage size because the heavy insulation makes the link appear to be a heavier gage than it actually is. The same wire size fusible link must be used when replacing a blown fusible link.

Fusible links are available with two types of insulation: Hypalon® and Silicone/GXL (SIL/GXL). Service fusible links made with SIL/GXL may be used to replace either Hypalon® or SIL/GXL fusible links. Service fusible links made with Hypalon® may only be used to replace Hypalon® fusible links. To determine the fusible link type, nick the insulation of the blown fusible link with a knife. SIL/GXL will have a white inner core under the outer color. Hypalon® insulation

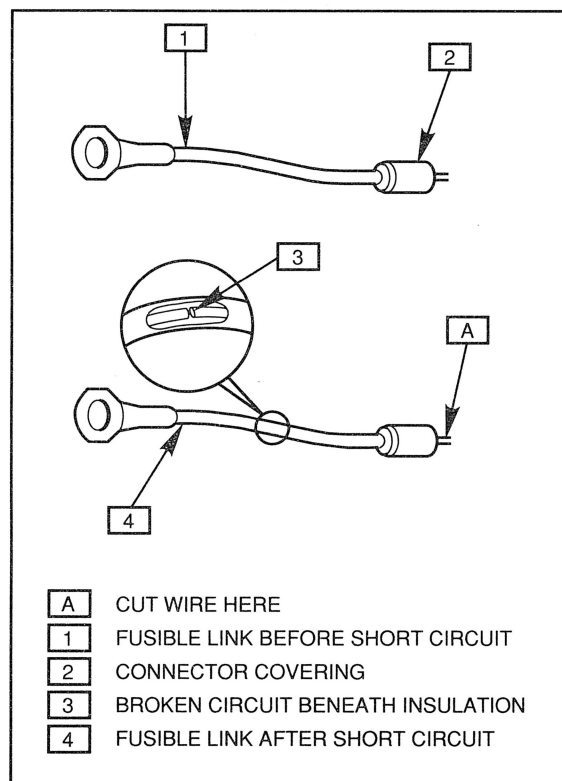


Figure 3 - Good and Damaged Fusible Links

is all one color. Service fusible links are available in many lengths. Choose the shortest length that is suitable. If the fusible link is to be cut from a spool, NEVER make it longer than 228 mm (9 inches).

CAUTION: Fusible links cut longer than 228 mm (9 inches) will not provide sufficient overload protection.

To replace a damaged fusible link, cut it off beyond the splice. Replace with a repair link (Figure 4). When connecting the repair link, strip wire and use staking-type pliers to crimp the splice securely in two places. For more details on splicing procedures, refer to the “Splicing Copper Wire” procedure later in this cell.

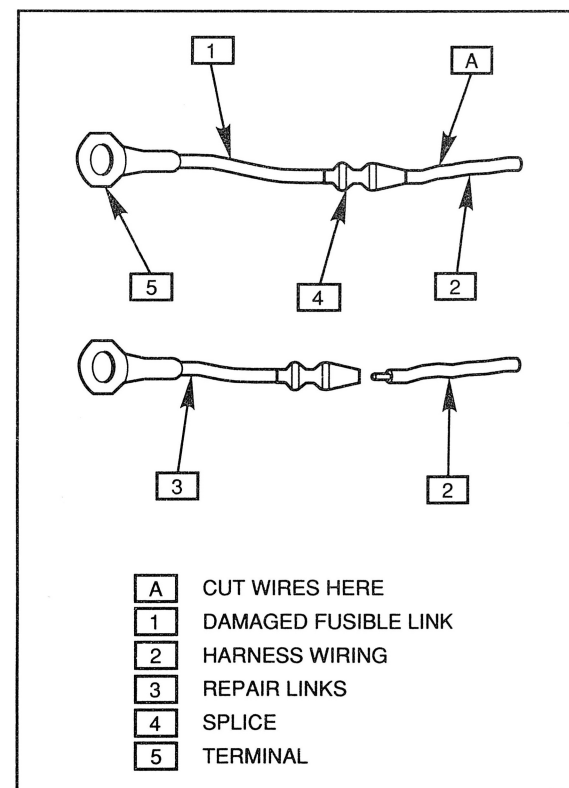


Figure 4 - Single Wire Feed Fusible Link

To replace a damaged fusible link which feeds two harness wires, cut them both off beyond the splice. Use two repair links, one spliced to each harness wire (Figure 5).

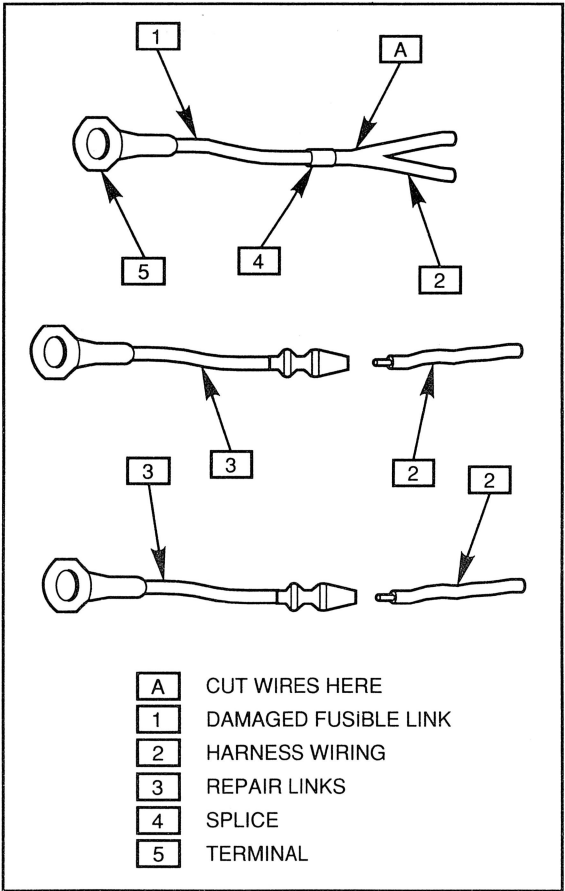


Figure 5 - Double Wire Feed Fusible Link

TYPICAL ELECTRICAL REPAIRS

An open circuit is an incomplete circuit. Power cannot reach the load or reach ground. If a circuit is open, active components do not energize. A short circuit is an unwanted connection between one part of the circuit and either ground or another part of the circuit. A short circuit causes a fuse to blow or a circuit breaker to open.

Short Circuits Caused by Damaged Wire Installation

1. Locate the damaged wire.
2. Find and correct the cause of the wire insulation damage.
3. For minor damage, tape over the wire. If damage is more extensive, replace the faulty segment of the wire. Refer to the "Splicing Copper Wire," "Splicing Aluminum Wire," or "Splicing Twisted/Shielded Cable" procedure later in this cell.

SPLICING COPPER WIRE

Step 1: Open the Harness

If the harness is taped, remove the tape. To avoid wire insulation damage, use a sewing "seam ripper" to cut open the harness (available from sewing supply stores).

If the harness has a black plastic conduit, simply pull out the desired wire. Note that aluminum wire is enclosed in brown conduit. Refer to the "Splicing Aluminum Wire" procedure later in this cell.

Step 2: Cut the Wire

Begin by cutting as little wire off the harness as possible. You may need the extra length of wire later if you decide to cut more wire off to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40 mm (1.5-inch) away from other splices, harness branches, or connectors.

Step 3: Strip the Insulation

When replacing a wire, use a wire of the same size as the original wire or larger. The schematics list wire size in metric units. The following table shows the commercial (AWG) wire sizes that can be used to replace each metric wire size (Figure 6). Each AWG size is either equal to or larger than the equivalent metric size.

METRIC WIRE SIZES	AWG SIZES
.22	24
.35	22
.5	20
.8	18
1.0	16
2.0	14
3.0	12
5.0	10
8.0	8
13.0	6
19.0	4
32.0	2

Figure 6 - Wire Size Conversion Table

REPAIR PROCEDURES

To find the correct wire size, either find the wire on the schematic page and convert the metric size to the AWG size or use an AWG wire gage.

If you aren't sure of the wire size, start with the largest opening in your wire stripper and work down until you get a clean strip of the insulation. Be careful to avoid nicking or cutting any of the wires.

Check the stripped wire for nicks or cut strands. If the wire is damaged, repeat the procedure on a new section of wire. The two stripped wire ends should be equal in length.

Step 4: Crimp the Wires

Select the proper clip to secure the splice. To determine the proper clip size for the wire being spliced, follow the directions included with your clips. Select the correct anvil on the crimper. (On most crimpers, your choice is limited to either a small or large anvil.) Overlap the two stripped wire ends and hold them between your thumb and forefinger (Figure 7). Then, center the splice clip under the stripped wires and hold it in place.

- Open the crimping tool to its full width and rest one handle on a firm flat surface.
- Center the back of the splice clip on the proper anvil and close the crimping tool to the point where the former touches the wings of the clip.

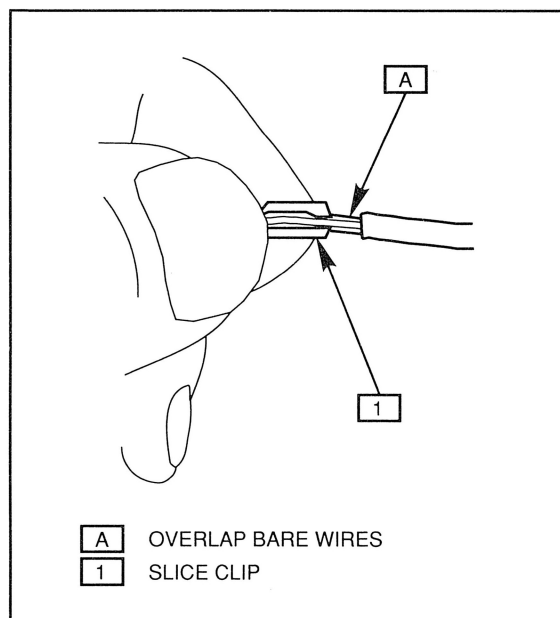


Figure 7 - Centering the Splice Clip

- Make sure that the clip and wires are still in the correct position. Then, apply steady pressure until the crimping tool closes (Figure 8).

Before crimping the ends of the clip, be sure that:

- The wires extend beyond the clip in each direction.
- No strands of wire are cut loose.
- No insulation is caught under the clip.

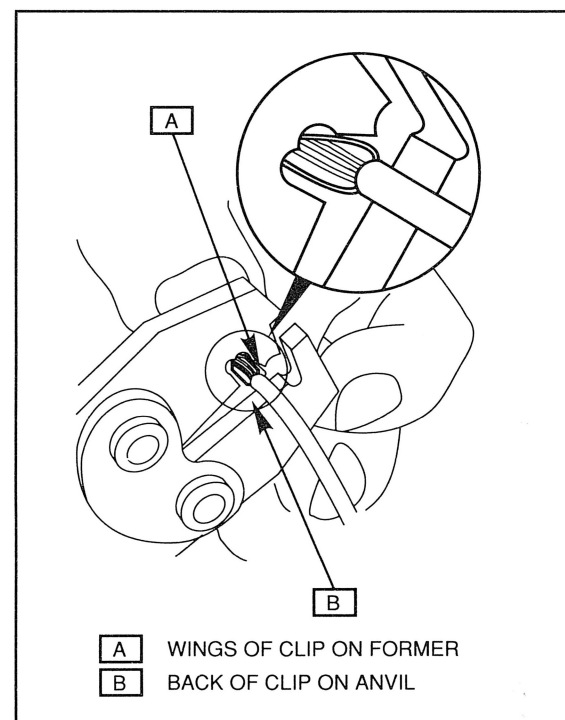


Figure 8 - Crimping the Splice Clip

Crimp the splice again, once on each end. Do not let the crimping tool extend beyond the edge of the clip or you may damage or nick the wires (Figure 9).

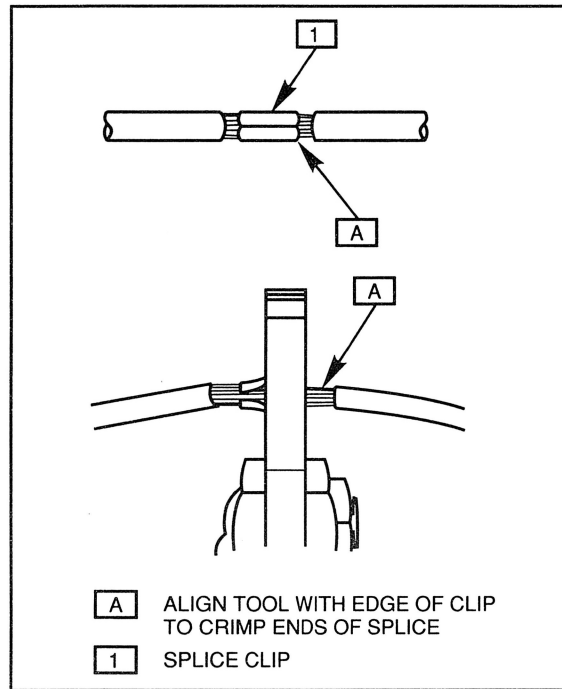


Figure 9 - Completing the Crimp

Step 5: Solder

Apply 60/40 rosin core solder to the opening in the back of the clip (Figure 10). Follow the manufacturer's instructions for the solder equipment you are using.

Step 6: Tape the Splice

Center and roll the splicing tape. The tape should cover the entire splice. Roll on enough tape to duplicate the thickness of the insulation on the existing wires. Do not flag the tape. Flagged tape may not provide enough insulation, and the flagged ends will tangle with the other wires in the harness (Figure 11).

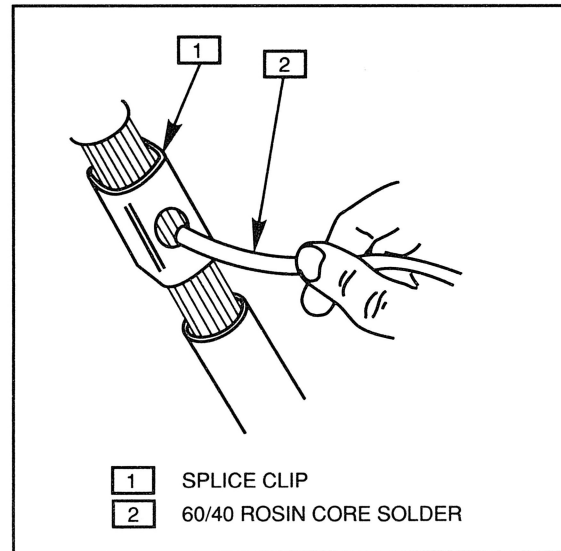


Figure 10 - Applying the Solder

If the wire does not belong in a conduit or other harness covering, tape the wire again. Use a winding motion to cover the first piece of tape (Figure 12).

SPLICING COPPER WIRE USING CRIMP AND SEAL SPLICE SLEEVES

Crimp and Seal splice sleeves may be used on all types of insulation except tefzel and coaxial to form a one-to-one splice. They are to be used where there are special requirements (moisture sealing). Refer to the appropriate section of the Service Manual to determine if the Crimp and Seal is necessary. Crimp and Seal splice sleeves are included in the J 38125 Terminal Repair Kit.

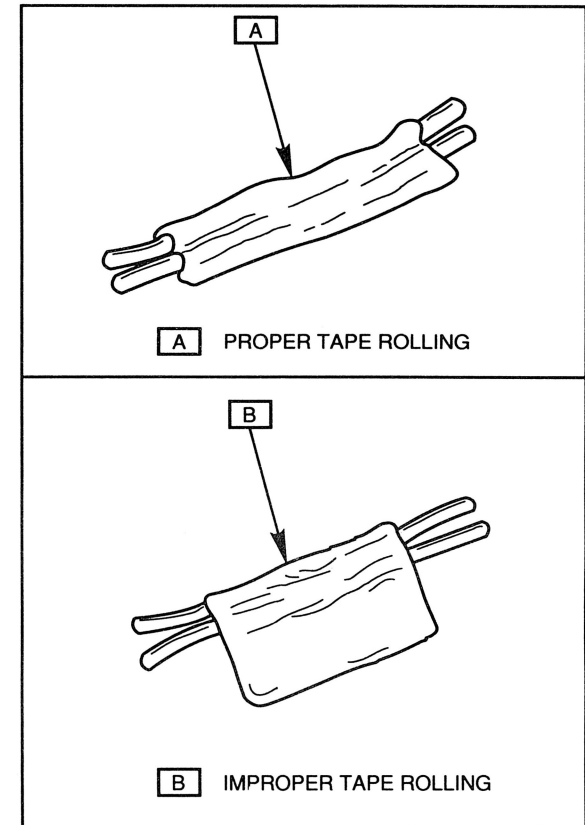


Figure 11 - Proper First Taping

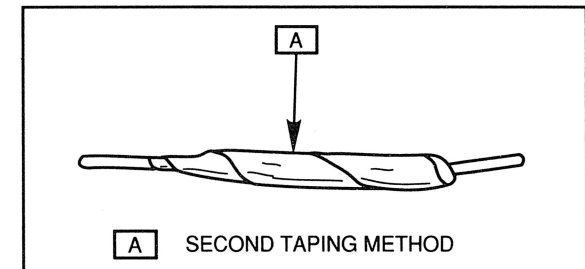


Figure 12 - Proper Second Taping

REPAIR PROCEDURES

Step 1: Open the Harness

If the harness is taped, remove the tape. To avoid wire insulation damage, use a sewing "seam ripper" to cut open the harness (available from sewing supply stores). The crimp and seal splice sleeves may be used on all types of insulation except tefzel and coaxial and may only be used to form a one-to-one splice.

Step 2: Cut the Wire

Begin by cutting as little wire off the harness as possible. You may need the extra length of wire later if you decide to cut more wire to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40 mm (1.5-inch) away from other splices, harness branches, or connectors. This will help prevent moisture from bridging adjacent splices and causing damage.

Step 3: Strip the Insulation

If it is necessary to add a length of wire to the existing harness, be certain to use the same size as the original wire (see table, Figure 6).

To find the correct wire size, either find the wire on the schematic and convert the metric size to the equivalent AWG size or use an AWG wire gage. If unsure about the wire size, begin with the largest opening in your wire stripper and work down until you get a clean strip of the insulation. Strip approximately 7.5 mm (0.31-inch) of insulation from each wire to be spliced. Be careful

to avoid nicking or cutting any of the wires. Check the stripped wire for nicks or cut strands. If the wire is damaged, repeat this procedure after removing the damaged section.

Step 4: Select and Position the Splice Sleeve

Select the proper splice sleeve according to wire size. The splice sleeves and tool nests are color coded.

Color splice sleeve	Crimp tool nest color	Wire gage AWG (metric)
Salmon (yellowish-pink)	Red	20, 18/ (0.5, 0.8)
Blue	Blue	16, 14/ (1.0, 2.0)
Yellow	Yellow	12, 10/ (3.0, 5.0)

Figure 13 – Crimp and Seal Splice Sleeve Chart

Using the J 38125-8 splice crimp tool (Figure 14), position the splice sleeve in the proper color nest of the hand crimp tool. Place the splice sleeve in the nest so that the crimp falls midway between the end of the barrel and the stop.

The sleeve has a stop in the middle of the barrel to prevent the wire from going further (Figure 15). Close the hand crimper handles slightly to hold the splice sleeve firmly in the proper nest.

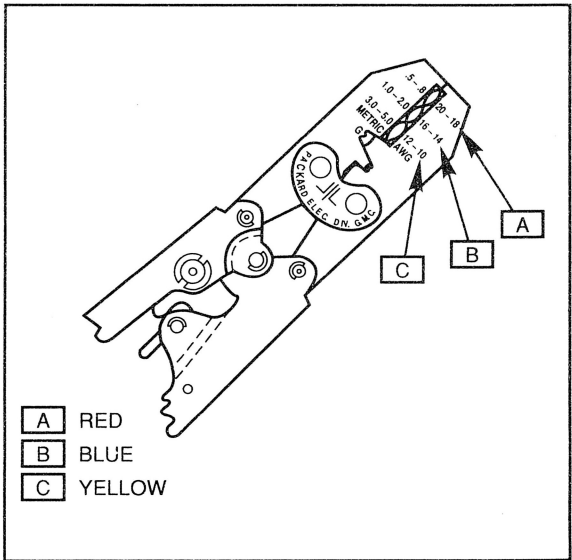


Figure 14 – Hand Crimp Tool

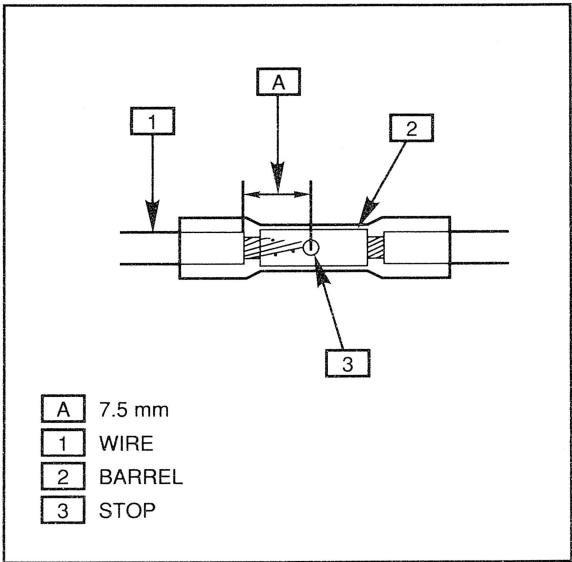


Figure 15 – Splice Before Crimping

REPAIR PROCEDURES

Step 5: Insert Wires into Splice Sleeve and Crimp

Insert the wire into the splice sleeve until it hits the barrel stop and close the handles of the J 38125-8 crimper tightly until the crimper handles open when released (Figures 15 and 16). The crimper handles will not open until the proper amount of pressure is applied to the splice sleeve. Repeat steps 4 and 5 for opposite end of the splice.

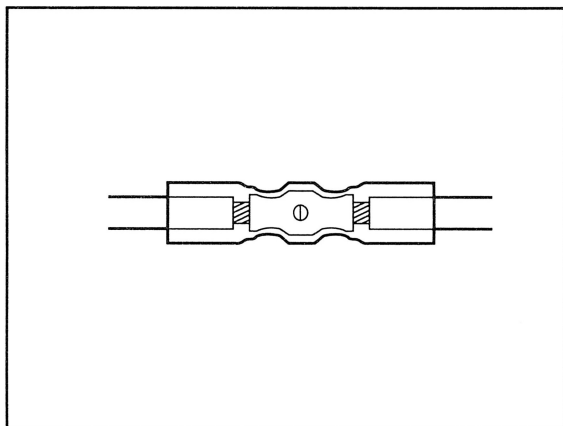


Figure 16 – Splice After Crimping

Step 6: Shrink the Insulation around the Splice

Using a heat torch, apply heat where the barrel is crimped.

Gradually move the torch to the open end of the tubing, shrinking the tubing completely as the heat is moved along the insulation. A small amount of sealant will come out of the end of the tubing when sufficient shrinking is achieved (Figure 17).

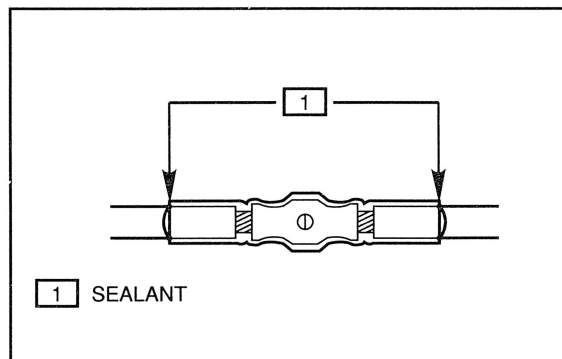


Figure 17 – Splice After Heating

SPLICING ALUMINUM WIRE

Some GM vehicles have a front body wiring harness made of 2.0 metric and 1.0 metric (14 and 16 gage) insulated solid cable aluminum wires. These wires are enclosed in a brown solid plastic conduit from behind the instrument panel to the rear of the car.

A special repair kit (1684873-GR.2.530-KIT-ALUM-WIRE TERMINAL REPAIR) is available to help make repairs on aluminum wires. This kit contains materials and instructions that can be used either to splice wire or crimp on new terminals. The kit includes the following parts:

- Small cylindrical metal splice clips.
- A plastic tube of petroleum jelly.
- Ten 2.0 metric (14 gage) DK GRN leads: 150 mm (6 inches) long with terminals.
- Ten 1.0 metric (16 gage) BRN leads: 150 mm (6 inches) long with terminals.

Use of the special materials in this kit will help prevent galvanic corrosion. Galvanic corrosion causes increased resistance between the terminal and wire, or the splice clip and wire, or both. Increased resistance would affect the operation of the electrical components in the repaired circuit.

Step 1: Open the Harness

Because the harness has a solid plastic conduit, simply cut the conduit open with diagonal cutters and pull out the desired wire. Be careful not to damage any of the wires when cutting open the conduit.

Step 2: Cut the Wire

Begin by cutting as little wire off the harness as possible. You may need the extra length of wire later if you decide to cut more wire off to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40 mm (1.5-inch) away from the other splices, harness branches, or connectors.

Step 3: Strip the Insulation

When replacing a wire or lead, use a wire of the same size as the original wire, or larger. Look up the metric size on the schematic and select the proper-sized leads from the special repair kit. Remember that the wires in this harness can only be one of two sizes-2.0 metric or 1.0 metric (14 or 16 gage).

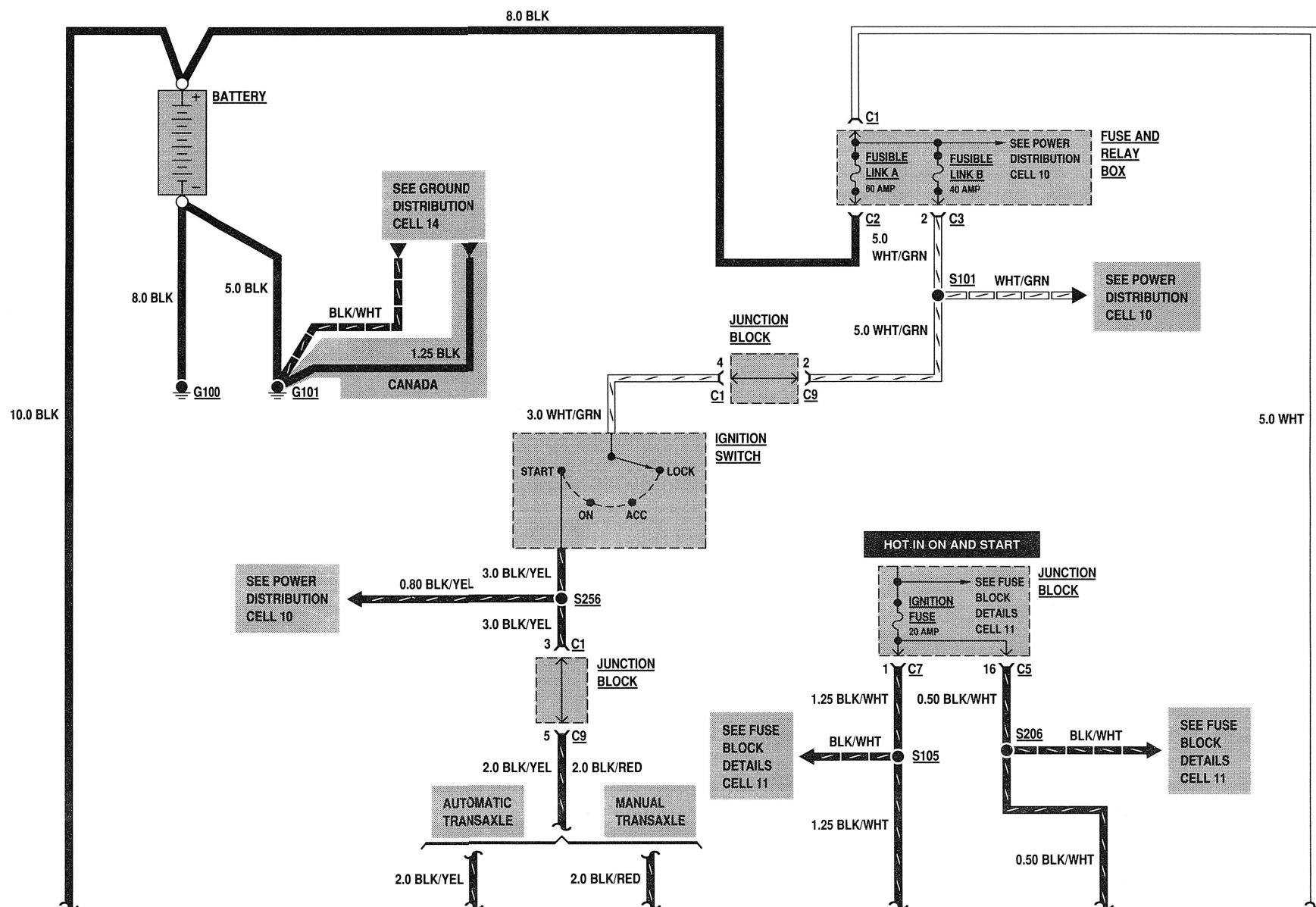
Use wire strippers of the proper gage to strip approximately 6 mm (0.25-inch) of insulation from each wire end.

BLANK

BLANK

GROUND DISTRIBUTION

COMPONENT	LOCATION	FIGURE	CONNECTOR
S216	Inner A/C Harness, near Thermistor	201-05/A	
S227	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S228	I/P Harness, behind LH I/P	201-04/B	
S229	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S230	I/P Harness, near Cigar Lighter Connector	201-04/B	
S231	I/P Harness, behind LH I/P near Blower Speed Selector Switch	201-04/B	
S262	SIR Harness, behind RH I/P	201-05/A	
S263	SIR Harness, behind I/P left of Steering Column	201-05/A	
S301	Floor Harness, under Driver's Seat	201-06/A	
S302	Floor Harness, near base of Safety Belt Switch Branch	201-06/A	
S401	RH Rear Combination Lamp Harness, at front of RH Rear Lamp Assembly		
S402	RH Rear Combination Lamp Harness, at front of RH Rear Lamp Assembly		
S403	LH Rear Combination Lamp Harness, at front of LH Rear Lamp Assembly		
S404	LH Rear Combination Lamp Harness, at front of LH Rear Lamp Assembly		
S405	Floor Harness, near LH Rear Combination Lamp	201-07/A	
G100	Mounted on Transaxle	201-02/A	
G101	LH Front Inner Fender	201-01/A	
G102	Rear of Engine above Starter Motor	201-00/A	
G104	RH Front Inner Fender	201-02/B	
G200	LH Kick Panel	201-05/A	
G201	RH Kick Panel	201-05/A	
G203	Junction Block Case Ground, under LH I/P	201-08/A	



REPAIR PROCEDURES

When stripping the outer jacket from the aluminum wire core, be careful not to nick or damage the core. A damaged core will weaken the assembly at this point.

Step 4: Coating the Splice/Terminal

To prevent corrosion, apply a generous coating of petroleum jelly to the splice area. If you are replacing a lead, also thoroughly coat the terminal crimp area and aluminum core with petroleum jelly. Both areas are shown and identified with the letter "A" (Figure 18).

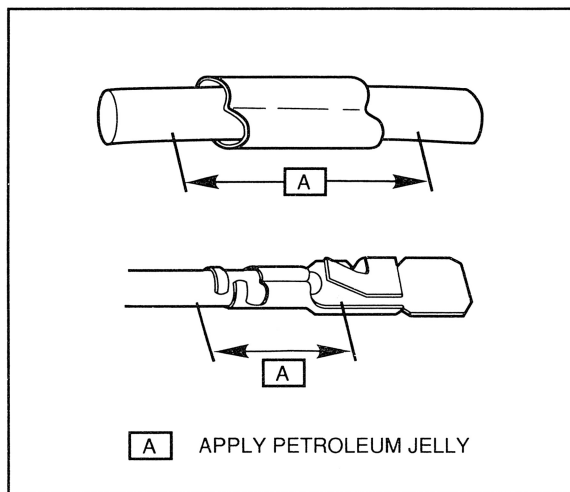


Figure 18 - Where to Apply Petroleum Jelly

Step 5: Crimp the Wires

- Select the proper-sized splice clip (follow the instructions included in the special repair kit).
- Place one wire end in each end of the splice clip.
- Crimp the clip firmly to the wire using 10-inch clip joint pliers. Do not solder the splice (Figure 19).
- Repeat this procedure for the second wire or lead in the splice clip.

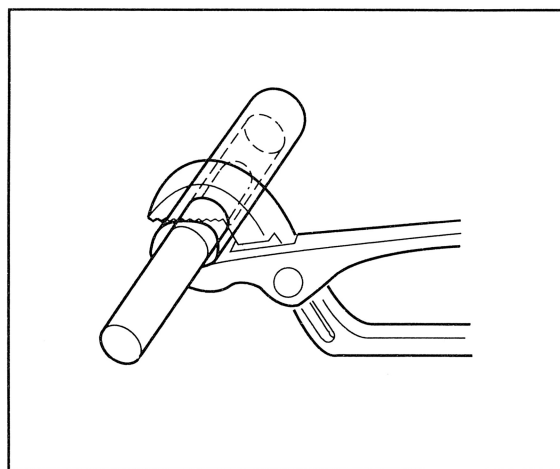


Figure 19 - Crimping the First Half of the Splice Clip (Aluminum Wire)

Step 6: Tape Splice/Insert Terminal

Tape over both the splice clip and the petroleum jelly to seal out moisture and insulate the splice (Figure 20). If you have replaced a lead, do not tape over the terminal crimp area but insert the lead into the connector body.

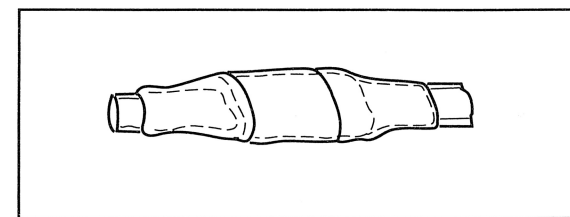


Figure 20 - Covering the Splice Clip and the Petroleum Jelly to Seal and Insulate

SPLICING TWISTED/SHIELDED CABLE

Twisted/shielded cable is sometimes used to protect wiring from electrical noise (stray signals). For example, two-conductor cable of this construction is used between the ECM and the distributor. A breakdown of twisted/shielded cable construction is shown (Figure 21).

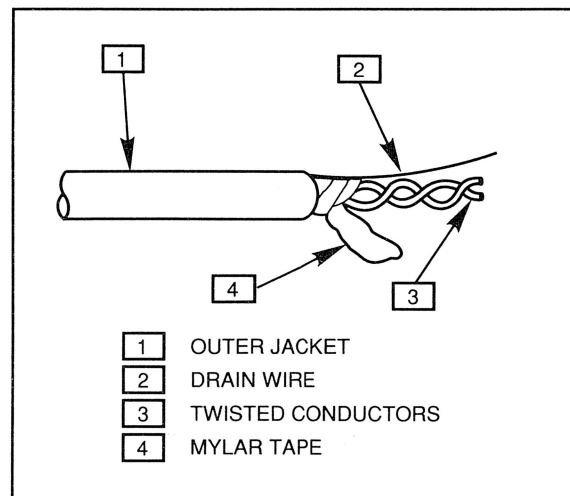


Figure 21 - Twisted/Shielded Cable

Step 1: Remove Outer Jacket

Remove the outer jacket and discard it. Be careful to avoid cutting into the drain wire or the mylar tape.

Step 2: Unwrap the Tape

Unwrap the aluminum/mylar tape, but do not remove it. The tape will be used to rewrap the twisted conductors after the splices have been made.

Step 3: Prepare the Splice

Untwist the conductors. Then, prepare the splice by following the splicing instructions for copper wire presented earlier. Remember to stagger splices to avoid shorts (Figure 22).

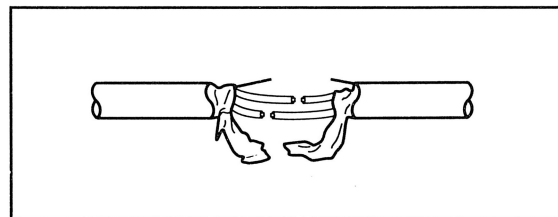


Figure 22 - Untwisted Conductors

Step 4: Re-Assemble the Cable

After you have spliced and taped each wire, rewrap the conductors with the mylar tape. Be careful to avoid wrapping the drain wire in the tape.

Next, splice the drain wire following the splicing instructions for copper wire. Then, wrap the drain wire around the conductors and mylar tape (Figure 23).

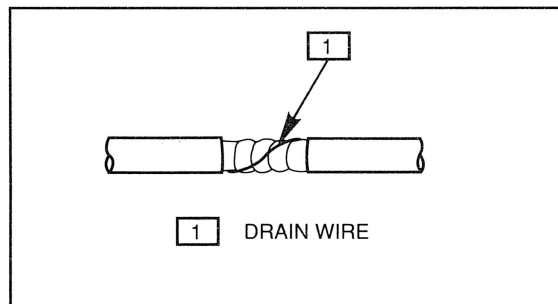


Figure 23 - Reassembled Cable

Step 5: Tape the Cable

Tape over the entire cable using a winding motion (Figure 24). This tape will replace the section of the jacket you removed to make the repair.

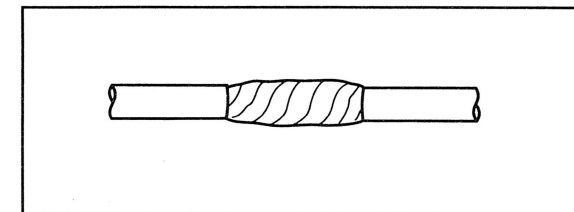


Figure 24 - Proper Taping

REPAIRING CONNECTORS

Weatherproof Connectors

The weatherproof connection system is used to provide weather protection on certain electrical circuits. Substitute connectors and terminals cannot be used to replace the weatherproof system, nor can cable or connector seals be left off from the repair method. If a weatherproof connection is damaged or requires repair for any reason, a new weatherproof connector must be spliced back into the harness. Refer to the "Splicing Copper Wire," "Splicing Aluminum Wire," or "Splicing Twisted/Shielded Cable" procedure earlier in this cell.

REPAIR PROCEDURES

WIRING REPAIR – SIR SYSTEM

Special wiring repair procedures have been developed for use on the Supplemental Inflatable Restraint (SIR) system due to the sensitive nature of the circuitry. These instructions are to be followed whenever servicing the SIR system wiring.

TERMINAL REPAIR KIT J 38125

Essential tool kit J 38125 contains special “sealed splices” for use in repairing SIR system wiring. A special crimping tool, heat torch, and instruction manual for these splices are also included.

Two critical features of the sealed splices are a special heat shrink sleeve with sealing adhesive to produce an environmentally sealed splice and a crosshatched (knurled) core crimp to provide necessary contact integrity for the sensitive, low energy circuits.

Tool kit J 38125 also serves as a generic terminal repair kit. The kit contains a large sampling of common GM electrical terminals and the correct tools to apply them to wires and remove them from connectors. The terminals in the kit are not to be used to replace damaged SIR system terminals unless otherwise indicated by the terminal package. Specifically the DERM/resistor terminal repair assembly pack, is included in the J 38125 for SIR use.

SIR CONNECTOR (PLASTIC BODY) AND TERMINAL (METAL PIN) REPAIR

If any connector or terminal in the SIR wire harness (except pigtail) is damaged, the component should be repaired using one of the connector repair assembly packs. These kits include an instruction sheet and the sealed splices which will be necessary to splice the new wires, connector, and terminals to the harness. Crimping tool J 38125-8 (the tool which is color keyed to match the splices) from Terminal Repair Kit J 38125 must be used to apply these splices.

The terminals in the SIR system are made of a special metal to provide necessary contact integrity for the sensitive low energy circuits. These terminals are only available in the connector repair assembly packs and no other terminals should be substituted.

If individual terminals are damaged on the DERM or resistor module, they should be repaired using the DERM/resistor terminal repair assembly pack. If individual terminals are damaged on any other SIR connection, the entire connection should be replaced using the appropriate connector repair assembly pack.

SIR WIRE PIGTAIL REPAIR

If the wiring pigtail (wire attached directly to the device), not by a connector (Sensor, Coil Assembly, or Inflator Module) is damaged, the entire component (with pigtail) should be replaced. Absolutely no wire, connector, or terminal repair is to be attempted on the Sensors, the Inflator Module or the SIR Coil Assembly.

SIR WIRE REPAIR

If any wire except the pigtail is damaged, the wire should be repaired by splicing in a new section of wire of the same gage size (0.5, 0.8, 1.0, etc.). The sealed splices and crimping tool from Terminal Repair Kit J 38125 must be used for these splices. Carefully follow the wiring repair procedures or the instructions included in the kit for proper sealing applications.

SIR SYSTEM WIRE SPLICE REPAIR

If any of the original equipment splices (S201, etc., three wires or more) in the SIR system wiring are damaged, they should be repaired by applying a new splice (not sealed) from the Terminal Repair Kit J 38125. Carefully follow the instructions included in the kit for proper splice clip application. Cloth duct tape may be substituted for splice tape if necessary.

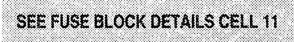
REPAIR PROCEDURES

ALTERNATIVE REPAIR METHODS

No alternative repair methods are available for the SIR system wiring and components. If the proper tools and/or components are not available, contact Technical Assistance Network to arrange for proper service of the SIR system.

MOLDED CONNECTORS

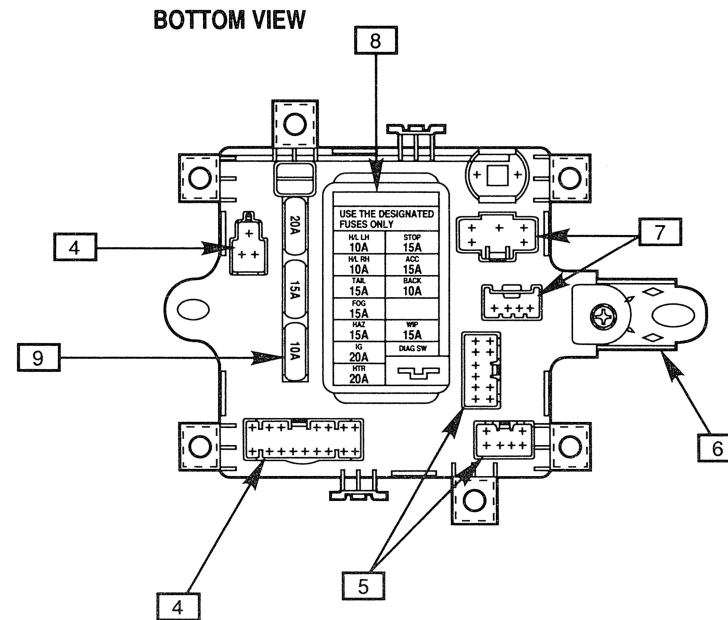
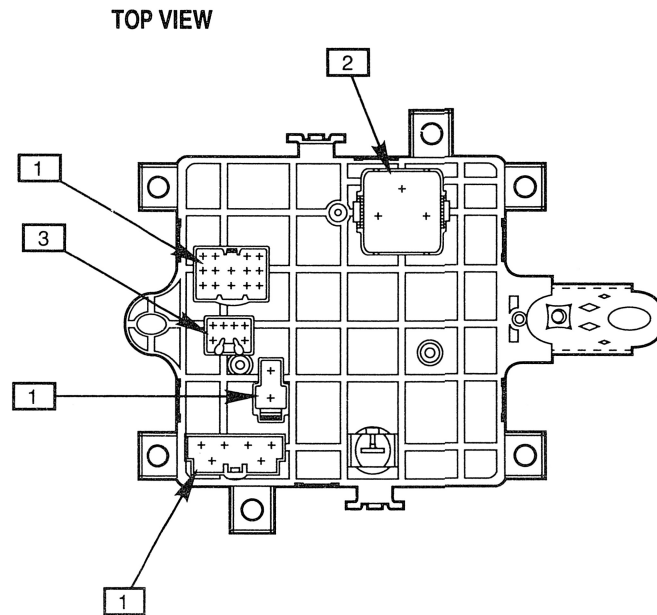
If a molded connector is damaged, it must be removed from the harness. It can be replaced by a similar connector. The new connector must be spliced back into the harness following recommended splicing procedures.



POWER DISTRIBUTION

COMPONENT	LOCATION	FIGURE	CONNECTOR
Battery	LH side of Engine Compartment	201-01/A	
Fuse and Relay Box	LH Engine Compartment behind Battery		
C1 (1 Cavity)	Generator to Fuse and Relay Box, below Fuse and Relay Box	201-01/A	
C2 (1 Cavity)	Battery Positive (+) to Fuse and Relay Box, below Fuse and Relay Box	201-01/A	
C3 (2 Cavities)	Main Harness to Fuse and Relay Box, below Fuse and Relay Box		
C4 (1 Cavity)	Fusible Link D Jumper to Fuse and Relay Box, below Fuse and Relay Box		
Generator	RH Rear Engine	201-00/A	
Ignition Switch	RH side of Steering Column		
Junction Block	Behind LH I/P	201-07/B	
C1 (5 Cavities)	Ignition Switch Jumper to Junction Block, behind LH I/P	201-07/B	202-02/B1
C9 (6 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/A1
SIR Fuse Box	Below LH I/P, attached to Junction Block	201-07/B	
Starter Motor	Center rear of Engine	201-00/A	
C101 (2 Cavities)	Main Harness to Fuel Injector Fuse Lead, near Fuse and Relay Box ...	201-01/A	
C102 (2 Cavities)	A/C Harness to A/C Fuse Lead, near Fuse and Relay Box		
C216 (2 Cavities)	SIR Harness to Ignition Switch Jumper, behind LH I/P near Steering Column	201-05/A	
S101	Main Harness, behind Coolant Reservoir		
S104	Fusible Link D Jumper, near Fuse and Relay Box		
S255	Ignition Switch Jumper, behind LH I/P	201-07/B	
S256	Ignition Switch Jumper, behind LH I/P	201-07/B	
G100	Mounted on Transaxle	201-02/A	
G101	LH Front Inner Fender	201-01/A	

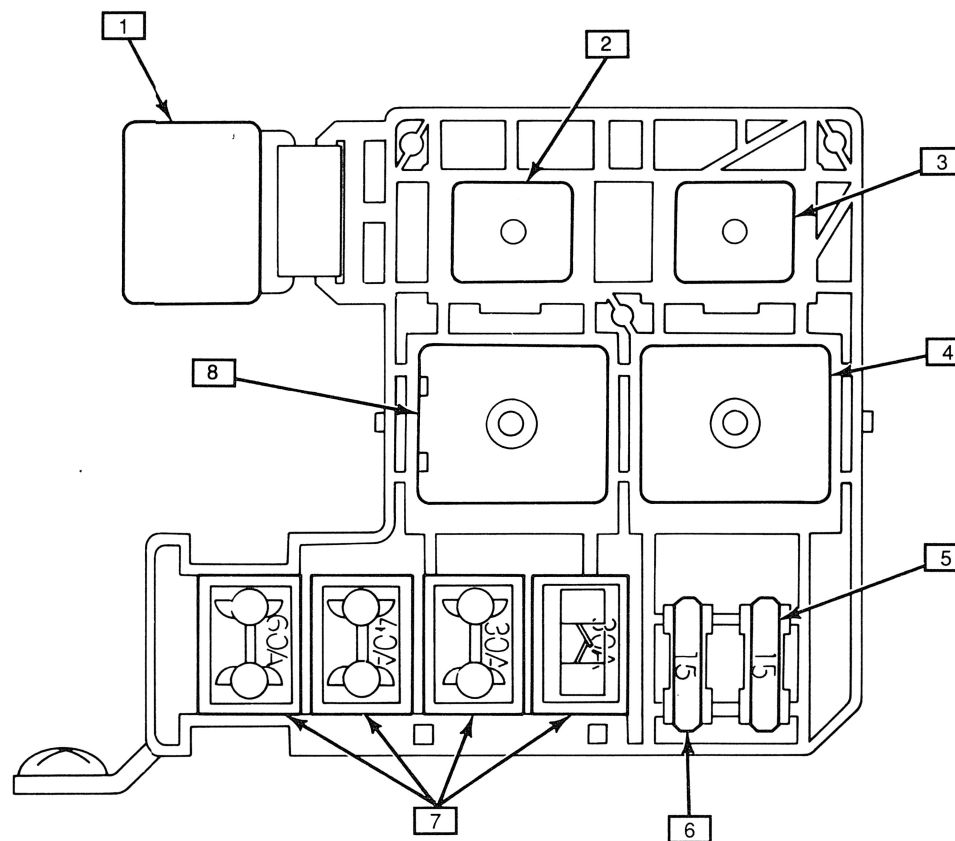
JUNCTION BLOCK



- 1 TO MAIN WIRING HARNESS NO. 1
- 2 TURN SIGNAL RELAY
- 3 TO FLOOR WIRING HARNESS NO. 3
- 4 TO INSTRUMENT PANEL WIRING HARNESS NO. 2
- 5 TO TURN SIGNAL/DIMMER SWITCH

- 6 GROUNDING BRACKET
- 7 TO IGNITION SWITCH
- 8 FUSE BLOCK
- 9 SPARE FUSES

FUSE AND RELAY BOX



- 1 HORN RELAY
- 2 A/C CONDENSER FAN RELAY
- 3 A/C CLUTCH RELAY
- 4 FUEL INJECTOR RELAY

- 5 A/C FUSE
- 6 FUEL INJECTOR FUSE
- 7 FUSIBLE LINKS
- 8 FUEL PUMP RELAY

FUSE APPLICATIONS

A/C FUSE (15A)

- A/C Clutch Relay
- A/C Condenser Fan Relay

ACC FUSE (15A)

- Cigar Lighter
- Radio

FUEL INJECTOR FUSE (15A)

- Fuel Injector Relay

HAZARD FUSE (15A)

- Horn Relay
- Light Switch

HEATER FUSE (20A)

- Blower Speed Selector Switch

IGNITION FUSE (20A)

- A/C Controller
- Arming Sensor
- Automatic Transaxle Controller
- Daytime Running Lamps Controller

- Diagnostic Energy Reserve Module
- Diagnostic Lamp
- Distributor
- Dual Pressure Switch
- Engine Cooling Fan Switch
- Fuel Injector Relay
- Fuel Pump Relay
- Generator
- Ignition Coil
- I/P Indicator Lamps and Gages
- Noise Suppressor Condenser
- Stoplamp Switch
- Warning Alarm Controller

LH HEADLAMP FUSE (10A)

- LH Headlamp
- Hi-Beam Indicator Lamp

RH HEADLAMP FUSE (10A)

- RH Headlamp

SIR IGN FUSE (15A)

- Diagnostic Energy Reserve Module

SIR ST FUSE (15A)

- Diagnostic Energy Reserve Module

STOP FUSE (15A)

- Stoplamp Switch

TAIL FUSE (15A)

- Dome Lamp
- Engine Control Module
- Ignition Key Warning Switch
- Light Switch
- Radio

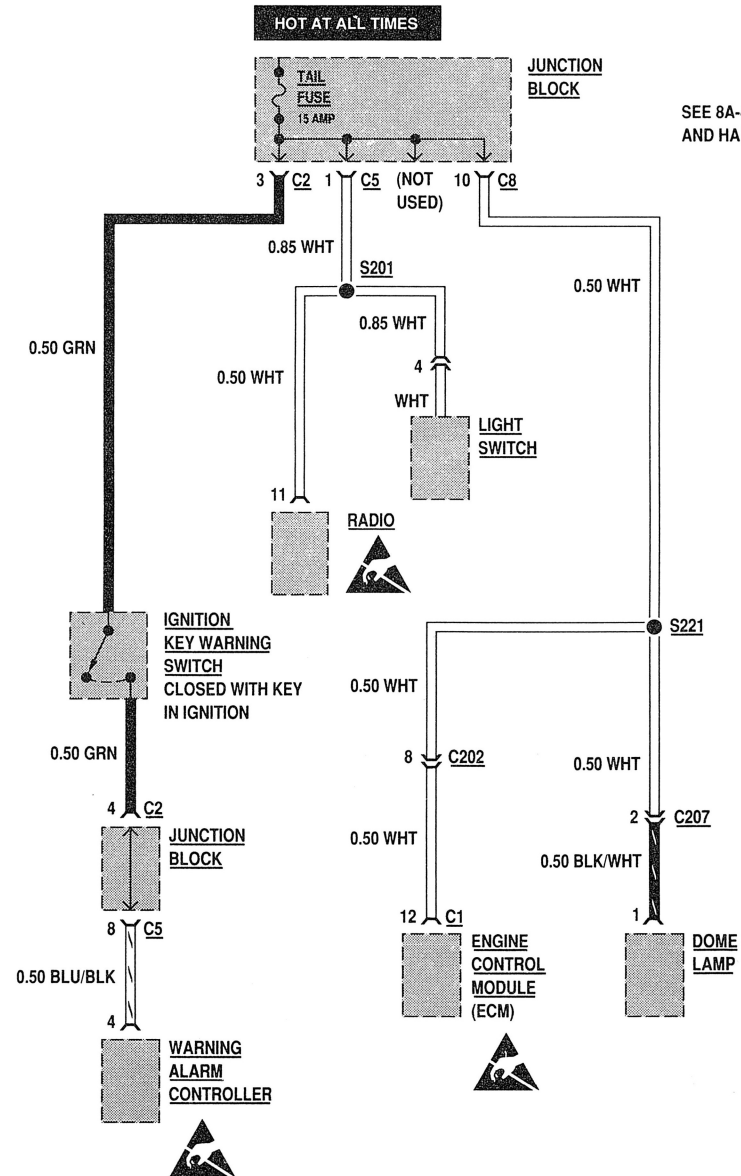
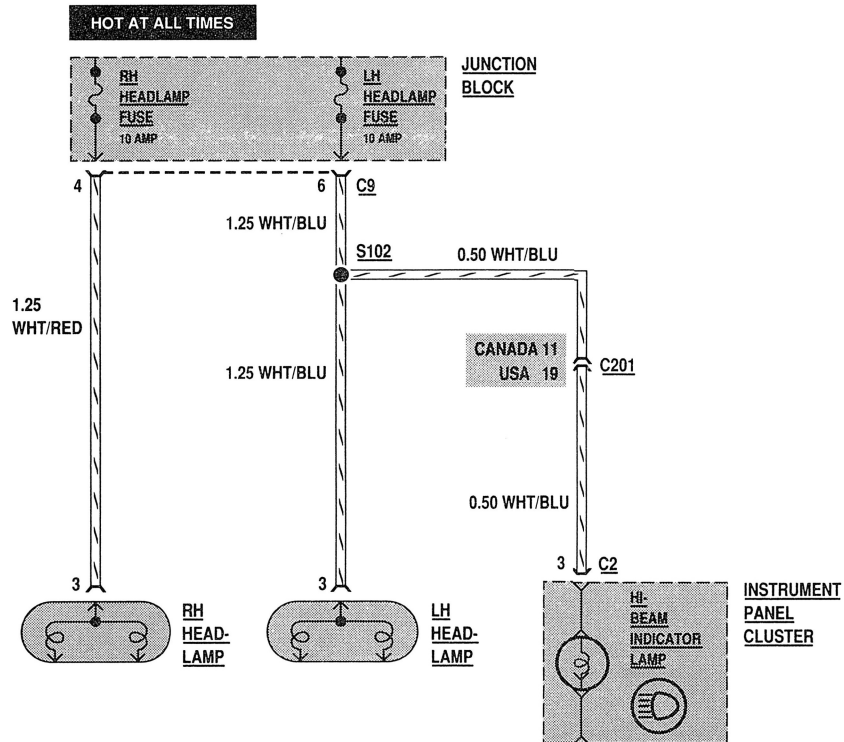
TURN BACK FUSE (10A)

- Backup Lamp Switch
- Light Switch
- Shift Lever Backup and Neutral Safety Switch

WIPER FUSE (15A)

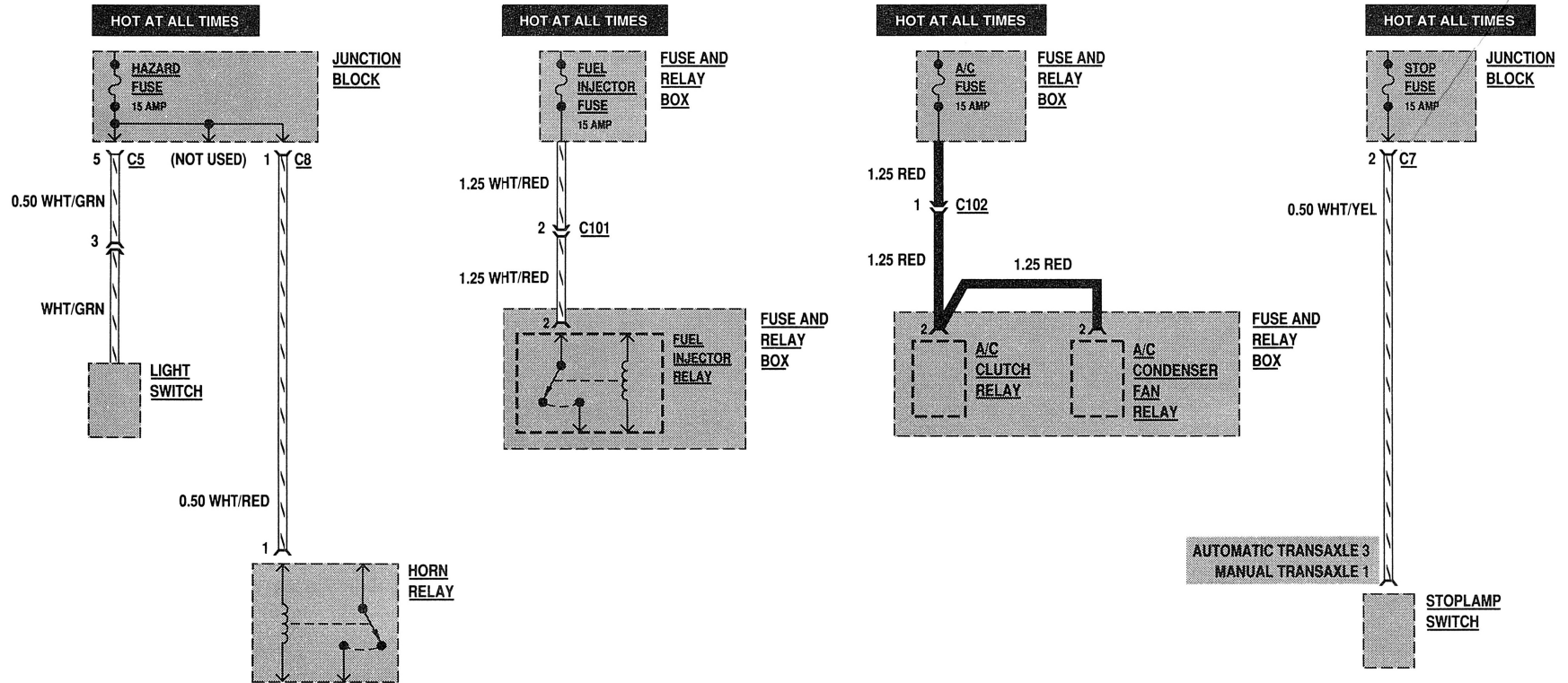
- Wiper Motor
- Wiper/Washer Switch

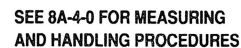
FUSE BLOCK DETAILS



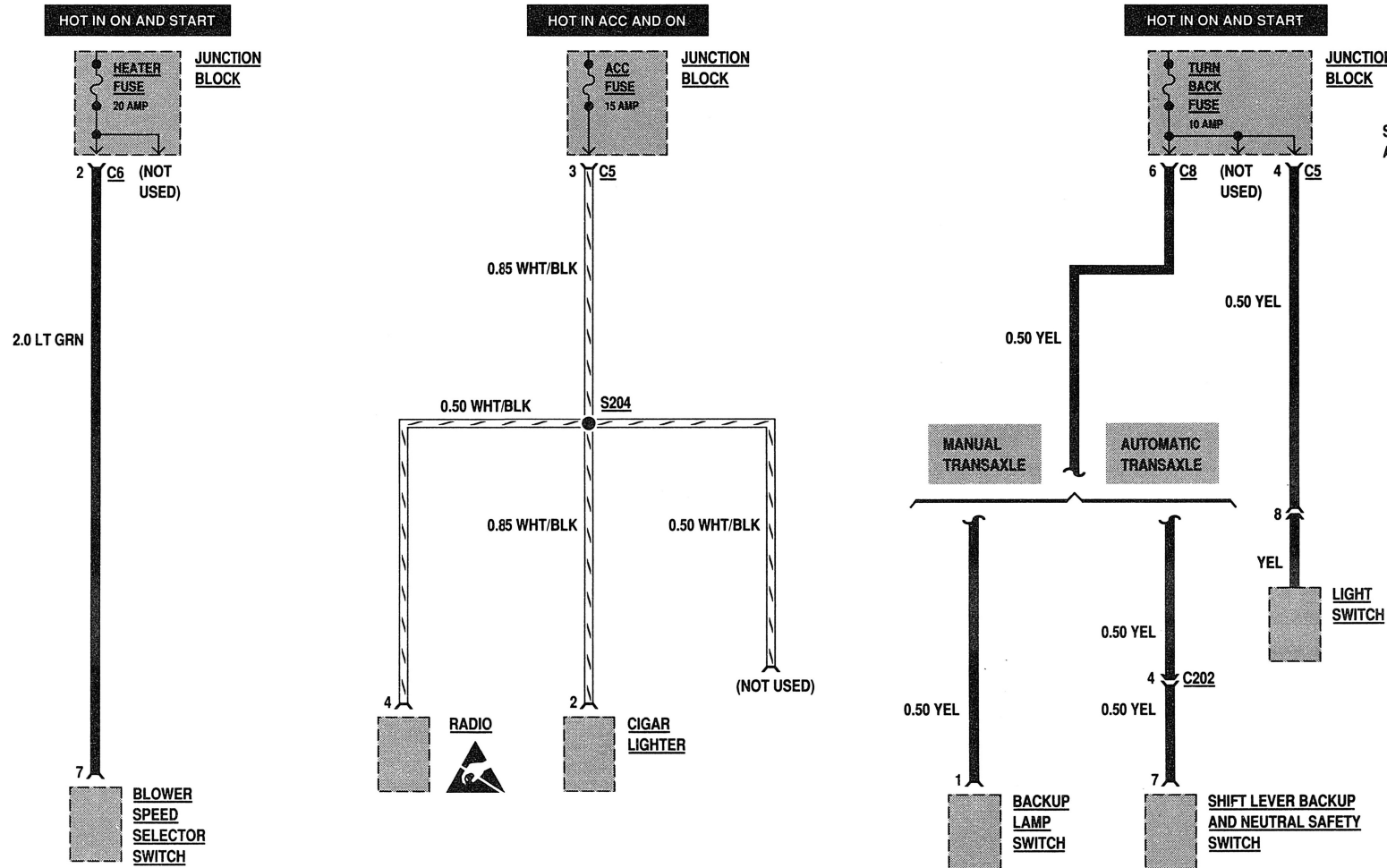
SEE 8A-4-0 FOR MEASURING AND HANDLING PROCEDURES

FUSE BLOCK DETAILS





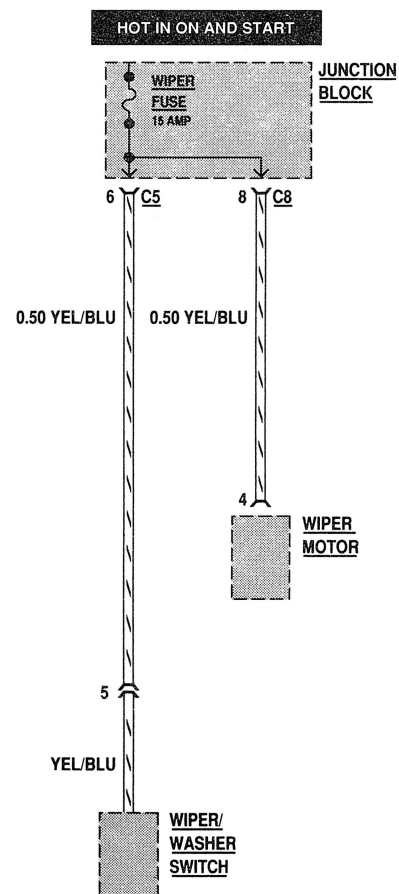
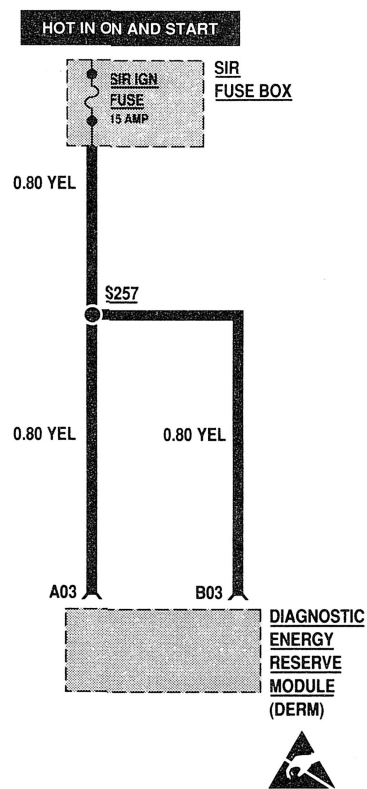
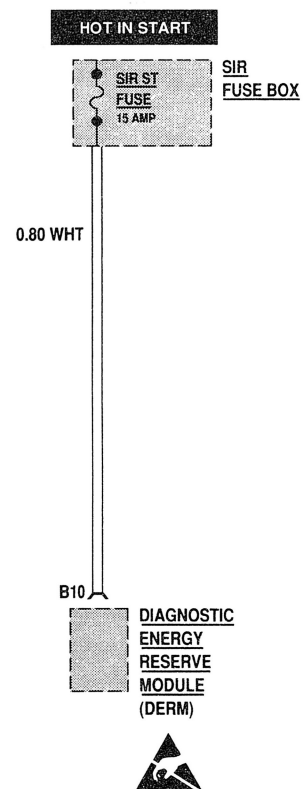
FUSE BLOCK DETAILS



SEE 8A-4-0 FOR MEASURING AND HANDLING PROCEDURES



FUSE BLOCK DETAILS



SEE 8A-4-0 FOR MEASURING AND HANDLING PROCEDURES

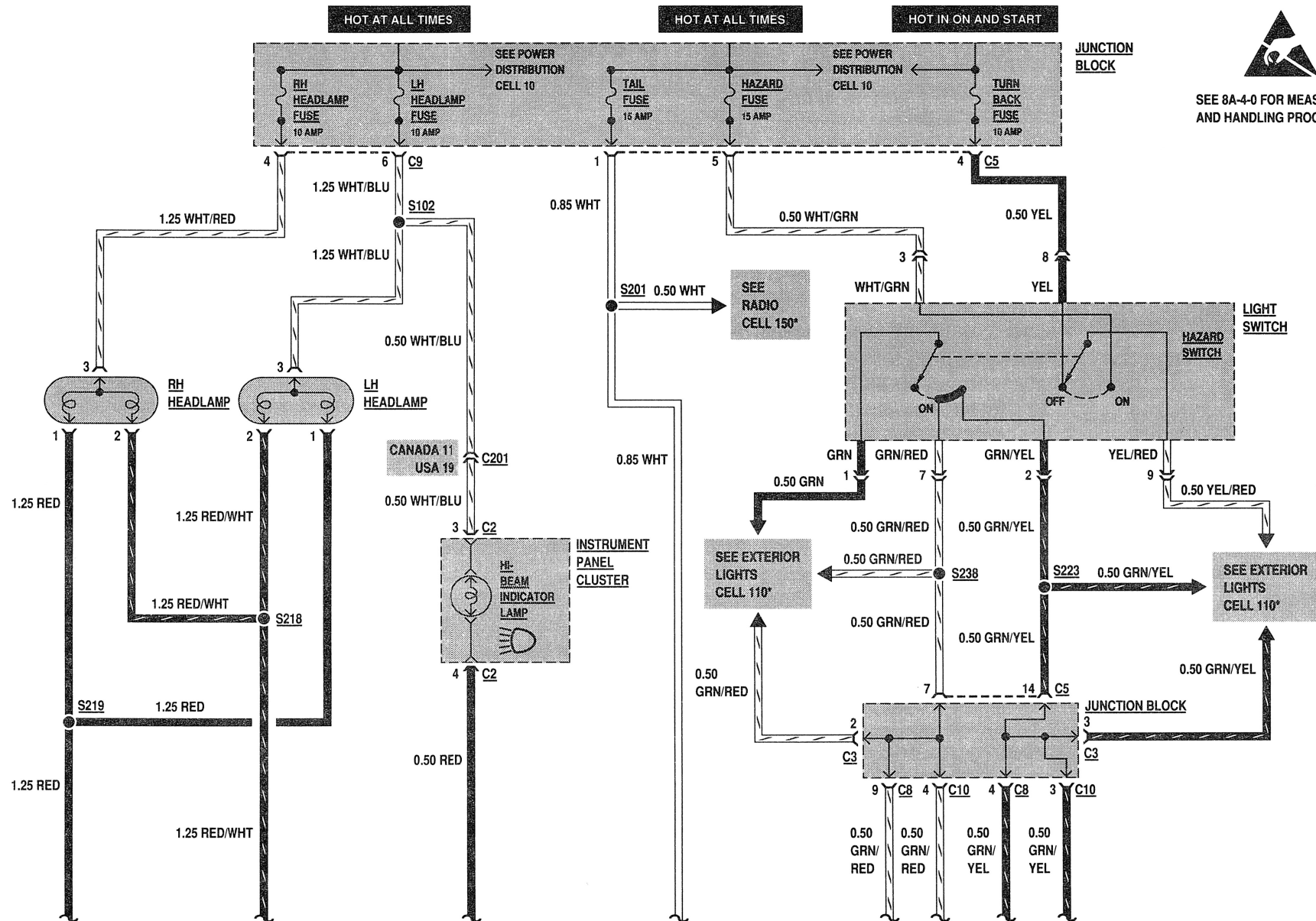
FUSE BLOCK DETAILS

COMPONENT	LOCATION	FIGURE	CONNECTOR
A/C Controller	Below RH I/P	201-05/A	202-00/B2
Arming Sensor	Behind RH I/P	201-05/A	
Automatic Transaxle Controller	Under I/P left of Steering Column	201-05/A	
C1 (14 Cavities)	Engine Harness to A/T Controller, below I/P left of Steering Column	201-05/A	202-01/C2
Backup Lamp Switch (M/T only)	LH Engine Compartment above Transaxle		
Blower Speed Selector Switch	Center of I/P below Radio	201-04/B	202-00/B3
Cigar Lighter	Center of I/P below Radio	201-04/B	
Daytime Running Lamps Controller	LH side of I/P Cluster	201-04/B	202-02/C2
Diagnostic Energy Reserve Module (DERM)	Behind I/P right of Steering Column	201-05/A	202-03/C1
Diagnostic Lamp	Below I/P right of Steering Column		
Distributor	Upper rear of Engine	201-00/A	
Dual Pressure Switch	RH Engine Compartment near Strut Tower		
Engine Control Module	Under I/P left of Steering Column	201-05/A	
C1 (12 Cavities)	Engine Harness to ECM, under I/P left of Steering Column	201-05/A	202-01/B3
Fan Thermostat Switch	Upper rear of Engine near Distributor	201-00/A	
Fuse and Relay Box	LH Engine Compartment behind Battery		
Generator	Right rear of Engine	201-00/A	
Horn Relay	LH Engine Compartment on Fuse and Relay Box	201-01/A	202-01/C3
Ignition Coil	LH Engine Compartment on Bulkhead		
Ignition Key Warning Switch	RH side of Steering Column		
Instrument Panel Cluster	LH Dash	201-04/B	
C1 (10 Terminals)	I/P Harness to I/P, behind upper RH corner of I/P Cluster	201-04/B	81-08
C2 (12 Terminals)	I/P Harness to I/P, behind upper LH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH I/P	201-07/B	
C2 (4 Cavities)	Ignition Switch to Junction Block, behind LH side of I/P		202-02/B2
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH side of I/P	201-07/B	202-02/C1
C6 (3 Cavities)	I/P Harness to Junction Block, behind LH side of I/P		
C7 (2 Cavities)	Main Harness to Junction Block, behind LH side of I/P	201-05/A	
C8 (14 Cavities)	Main Harness to Junction Block, behind LH side of I/P	201-05/A	202-03/B1
C9 (6 Cavities)	Main Harness to Junction Block, behind LH side of I/P	201-05/A	202-03/A1
Light Switch	LH side of Cluster Switch Panel	201-04/B	202-00/B2
Noise Suppressor Condenser	Mounted to Ignition Coil	201-01/A	
Radio	Center of I/P	201-04/B	202-00/C1

FUSE BLOCK DETAILS

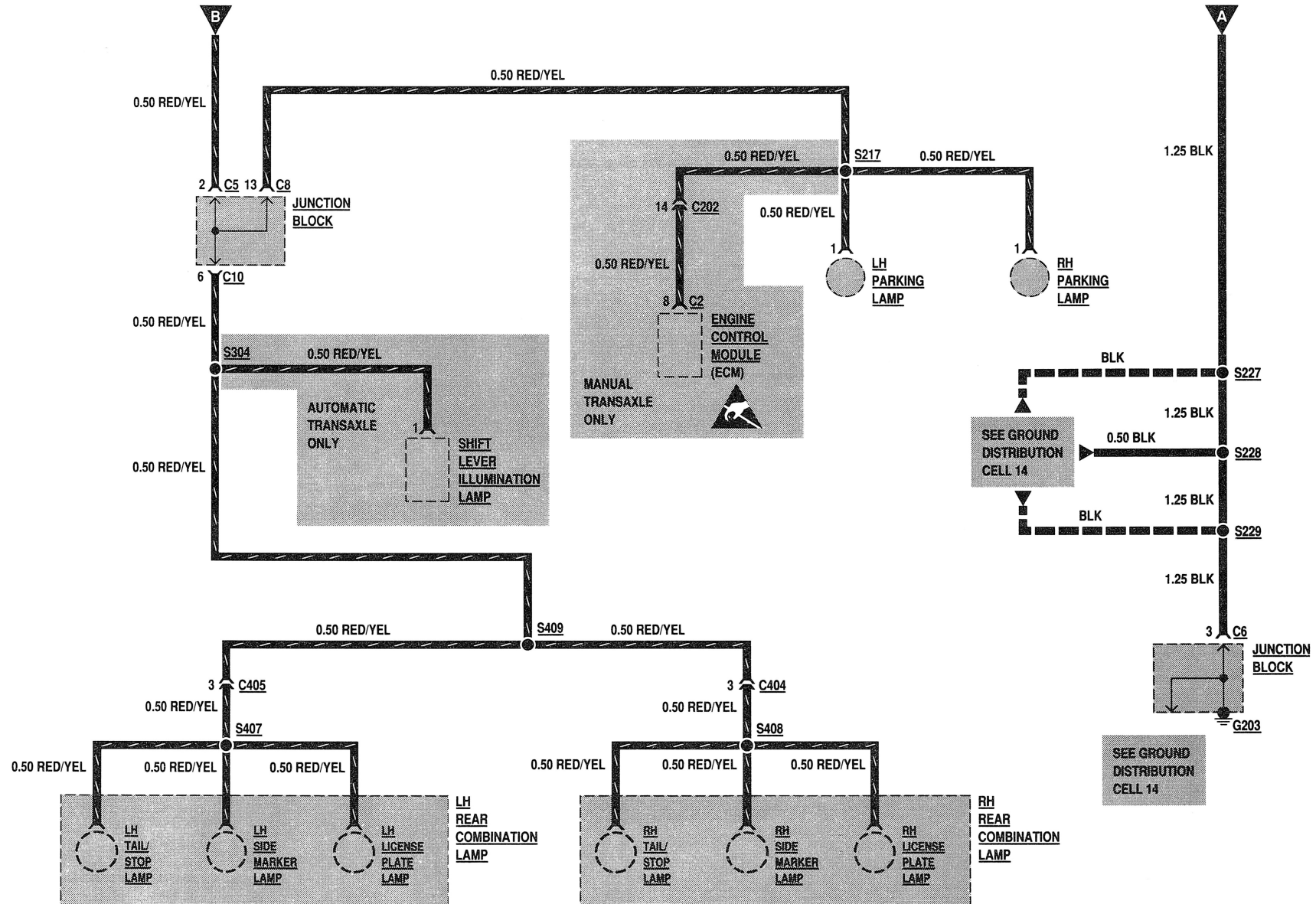
COMPONENT	LOCATION	FIGURE	CONNECTOR
Shift Lever Backup and Neutral Safety Switch (Automatic Transaxle Only)	Center Engine Compartment above Transaxle	201-02/A	202-01/B2
Stoplamp Switch	Top of Brake Pedal	201-05/A	
Warning Alarm Controller	Lower I/P left of Steering Column	201-04/B	202-02/A2
Wiper Motor	RH Rear Engine Compartment on Bulkhead	201-04/A	202-01/C3
Wiper/Washer Switch	RH side of Cluster Switch Panel	201-05/A	202-02/A1
C101 (2 Cavities)	Main Harness to Fuel Injector Fuse Lead, near Fuse and Relay Box	201-01/A	
C102 (2 Cavities)	A/C Harness to A/C Fuse Lead, near Fuse and Relay Box		
C103 (8 Cavities)	Main Harness to Engine Harness, LH Engine Compartment	201-02/A	202-01/C1
C111 (4 Cavities)	Main Harness to Outer A/C Harness, RH Front Inner Fender	201-02/B	202-03/A3
C201 (18 Cavities) (USA)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/A3
C201 (20 Cavities) (Canada)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/C3
C202 (15 Cavities)	Main Harness to Engine Harness, behind I/P near Junction Block	201-05/A	202-01/B1
C207 (2 Cavities)	Main Harness to Dome Lamp Harness, RH Upper Cowl	201-05/A	
C208 (8 Cavities)	Main Harness to Inner A/C Harness, behind RH I/P	201-05/A	202-02/A1
C217 (2 Cavities)	SIR Harness to Main Harness, behind LH side of I/P	201-05/A	
S102	Main Harness, in Engine Compartment near Bulkhead Grommet		
S105	Main Harness, near LH Grommet	201-01/A	
S106	Main Harness, between Fuse and Relay Box and Grommet		
S107	Main Harness, below Fuse and Relay Box		
S108	Main Harness, on Bulkhead near Duty Check Coupler		
S109	Engine Harness, between Transaxle and Bulkhead		
S110	Engine Harness, near Distributor		
S201	I/P Harness, behind LH I/P	201-04/B	
S204	I/P Harness, behind Center I/P	201-04/B	
S206	I/P Harness, behind I/P above Warning Alarm Controller	201-04/B	
S221	Main Harness, behind LH I/P	201-05/A	
S239	Main Harness, behind RH I/P	201-05/A	
S257	SIR Harness, right of Steering Column	201-05/A	

LIGHT SWITCH DETAILS





LIGHT SWITCH DETAILS



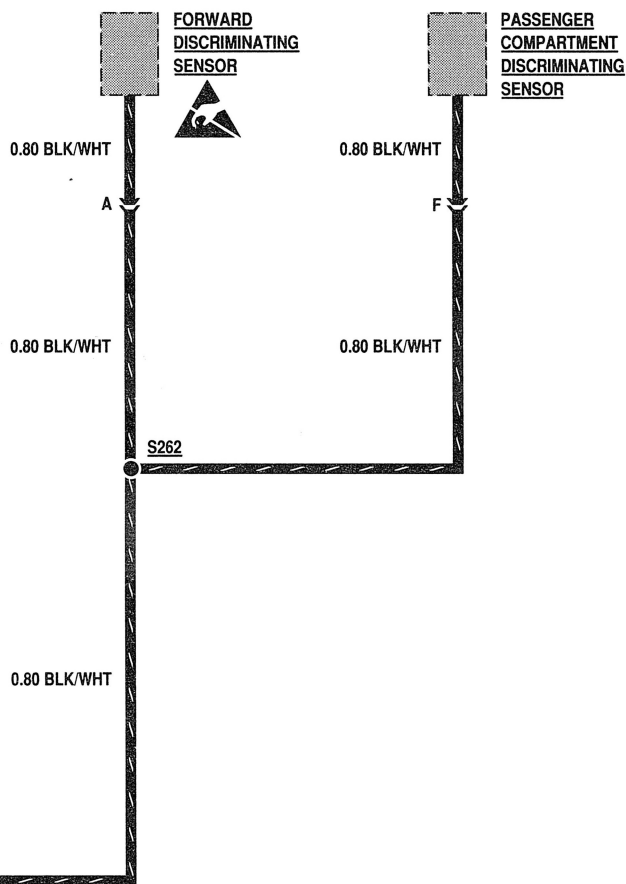
LIGHT SWITCH DETAILS

COMPONENT	LOCATION	FIGURE	CONNECTOR
Blower Speed Selector Switch	Center of I/P below Radio	201-04/B	202-00/B3
Combination Turn Signal/Dimmer Switch	LH side of Steering Column		202-02/B3
Engine Control Module	Below I/P left of Steering Column	201-05/A	
C2 (18 Cavities)	Engine Harness to ECM, below LH I/P left of Steering Column	201-05/A	202-01/A2
Illumination Controller	LH I/P left of Steering Column	201-04/B	
Instrument Panel Cluster	LH Dash	201-04/B	
C2 (12 Terminals)	I/P Harness to I/P Cluster, behind upper LH corner of I/P Cluster	201-04/B	202-00/C2
Junction Block	Below LH I/P	201-07/B	
C3 (6 Cavities)	Combination Switch to Junction Block, behind LH I/P		202-00/A2
C4 (10 Cavities)	Combination Switch to Junction Block, behind LH I/P		202-02/B3
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
C6 (3 Cavities)	I/P Harness to Junction Block, behind LH I/P		
C8 (14 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/B1
C9 (6 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/A1
C10 (6 Cavities)	Floor Harness to Junction Block, behind LH I/P	201-06/A	202-00/A2
Light Switch	LH side of Cluster Switch Panel	201-04/B	202-00/B2
Radio	Center of I/P	201-04/B	202-00/C1
Shift Lever Illumination Lamp (Automatic Transaxle Only)	Center of Passenger Compartment on Floor	201-06/A	
Warning Alarm Controller	Lower I/P left of Steering Column	201-04/B	202-02/A2
Wiper/Washer Switch	RH side of Cluster Switch Panel	201-04/B	202-02/A1
C202 (15 Cavities)	Main Harness to Engine Harness, behind I/P near Junction Block	201-05/A	202-01/B1
C404 (6 Cavities)	Floor Harness to RH Rear Combination Lamp, front of RH Rear Lamp Assembly	201-07/A	202-00/A3
C405 (6 Cavities)	Floor Harness to LH Rear Combination Lamp, front of LH Rear Lamp Assembly	201-07/A	202-00/A3
S102	Main Harness, in Engine Compartment near LH Grommet		
S129	Main Harness, near LH Grommet	201-01/A	
S201	I/P Harness, behind LH I/P	201-04/B	
S208	I/P Harness, behind LH I/P	201-04/B	
S211	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S215	I/P Harness, near Blower Speed Selector Switch	201-04/B	
S218	Main Harness, near LH Grommet	201-05/A	

LIGHT SWITCH DETAILS

COMPONENT	LOCATION	FIGURE	CONNECTOR
S219	Main Harness, near LH Grommet	201-05/A	
S223	I/P Harness, left of I/P Cluster	201-04/B	
S226	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S227	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S228	I/P Harness, behind LH I/P	201-04/B	
S229	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S238	I/P Harness, near base of Illumination Controller	201-04/B	
S259 (Canada Only)	I/P Harness, below LH I/P	201-04/B	
S304	Floor Harness, near base of Safety Belt Switch Branch	201-06/A	
S407	LH Rear Combination Lamp Harness, at front of LH Rear Combination Lamp Assembly		
S408	RH Rear Combination Lamp Harness, at front of RH Rear Combination Lamp Assembly		
S409	Floor Harness, LH rear corner of Vehicle	201-08/A	
G203	Junction Block Case Ground, under LH I/P	201-08/A	

USA

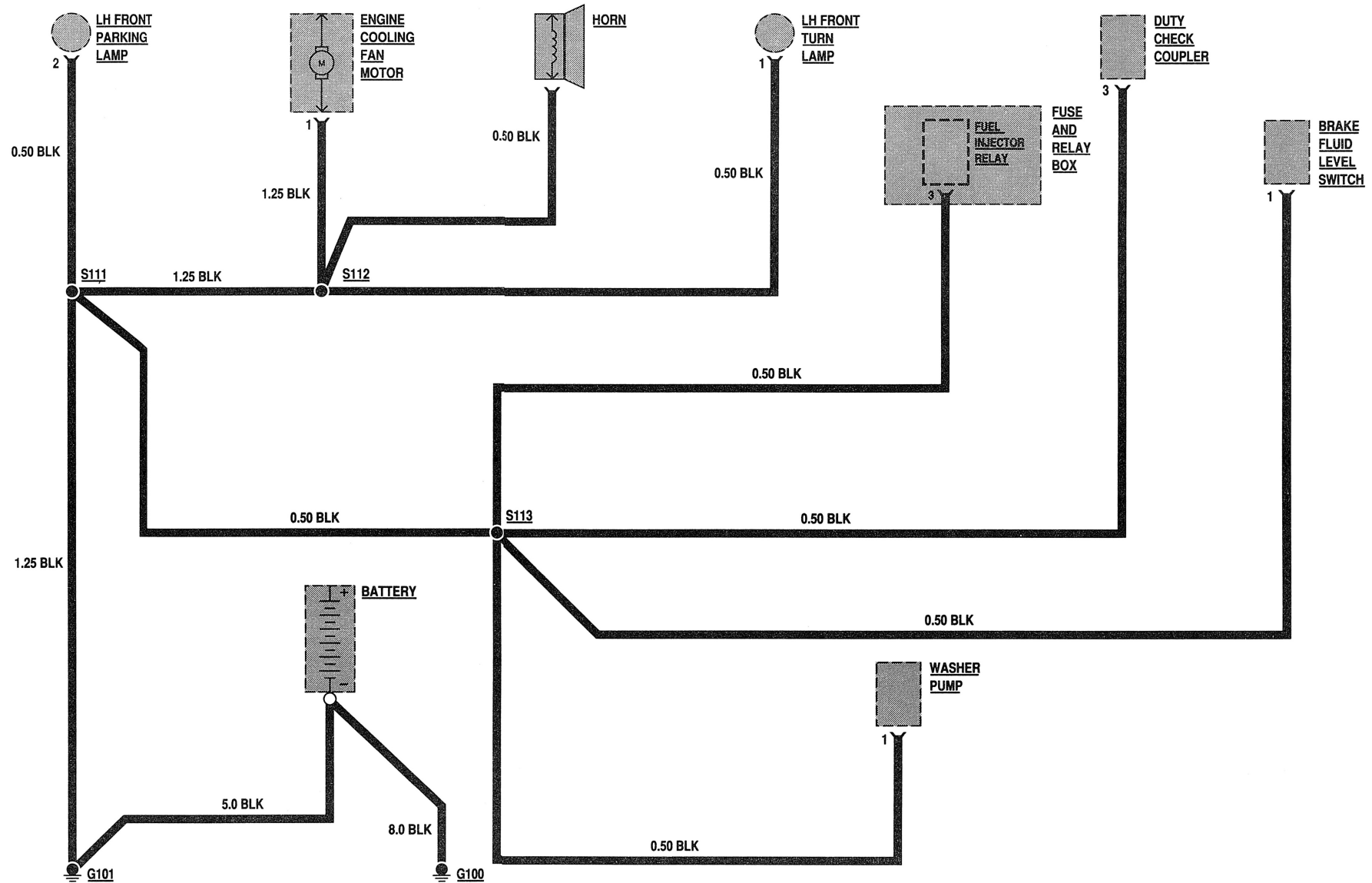


**SEE 8A-4-0 FOR MEASURING
AND HANDLING PROCEDURES**

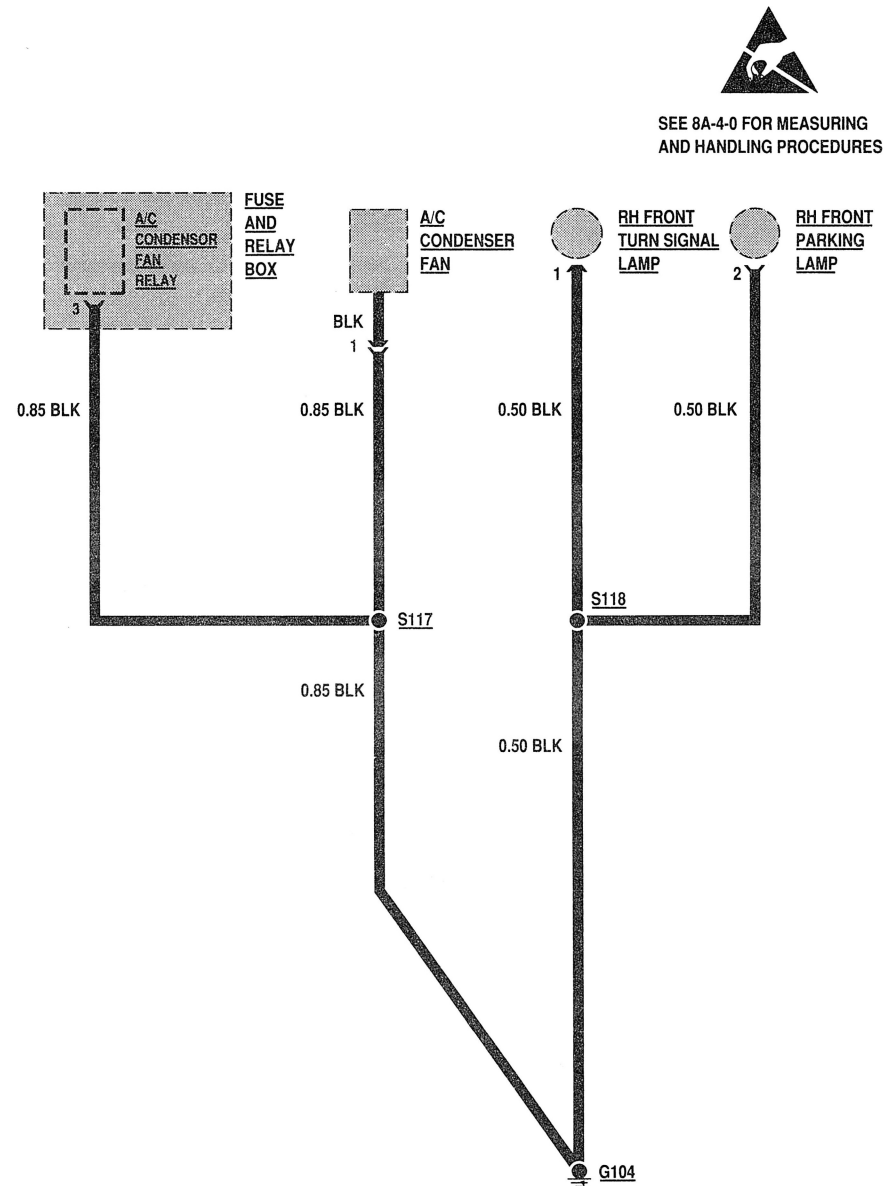
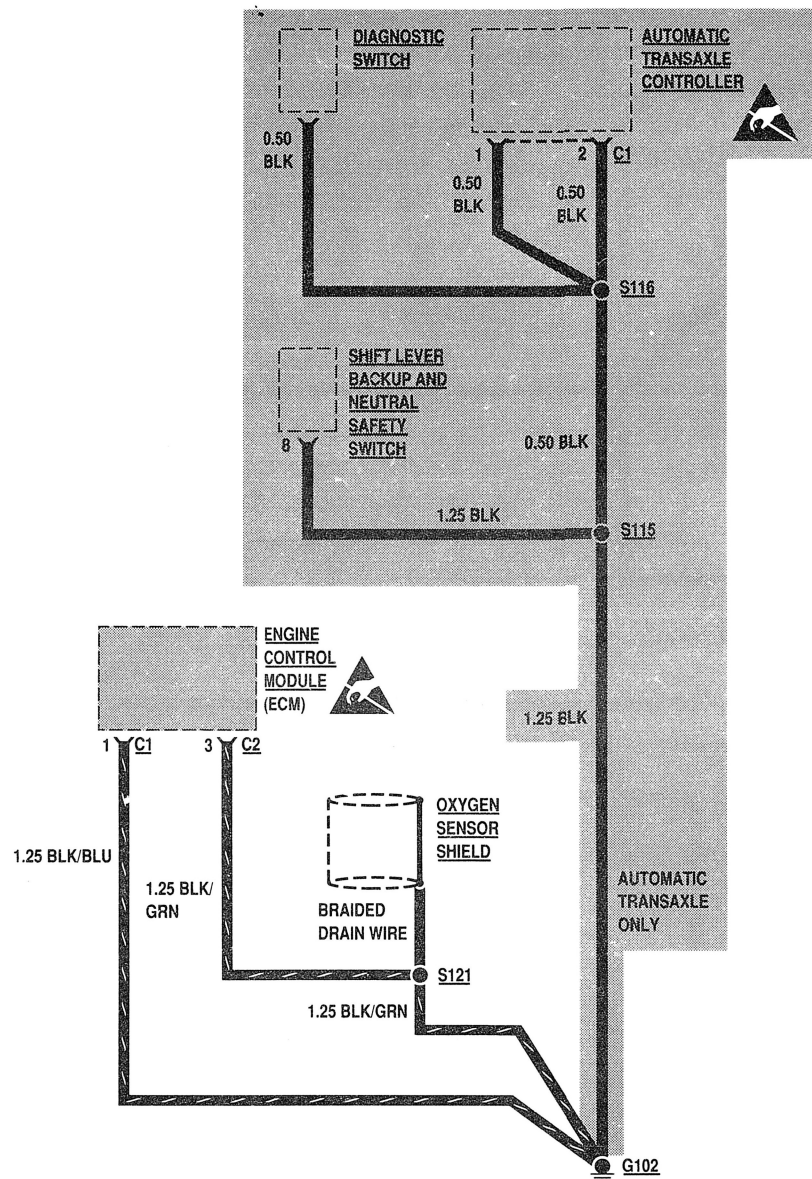


GROUND DISTRIBUTION: G100 AND G101

CANADA

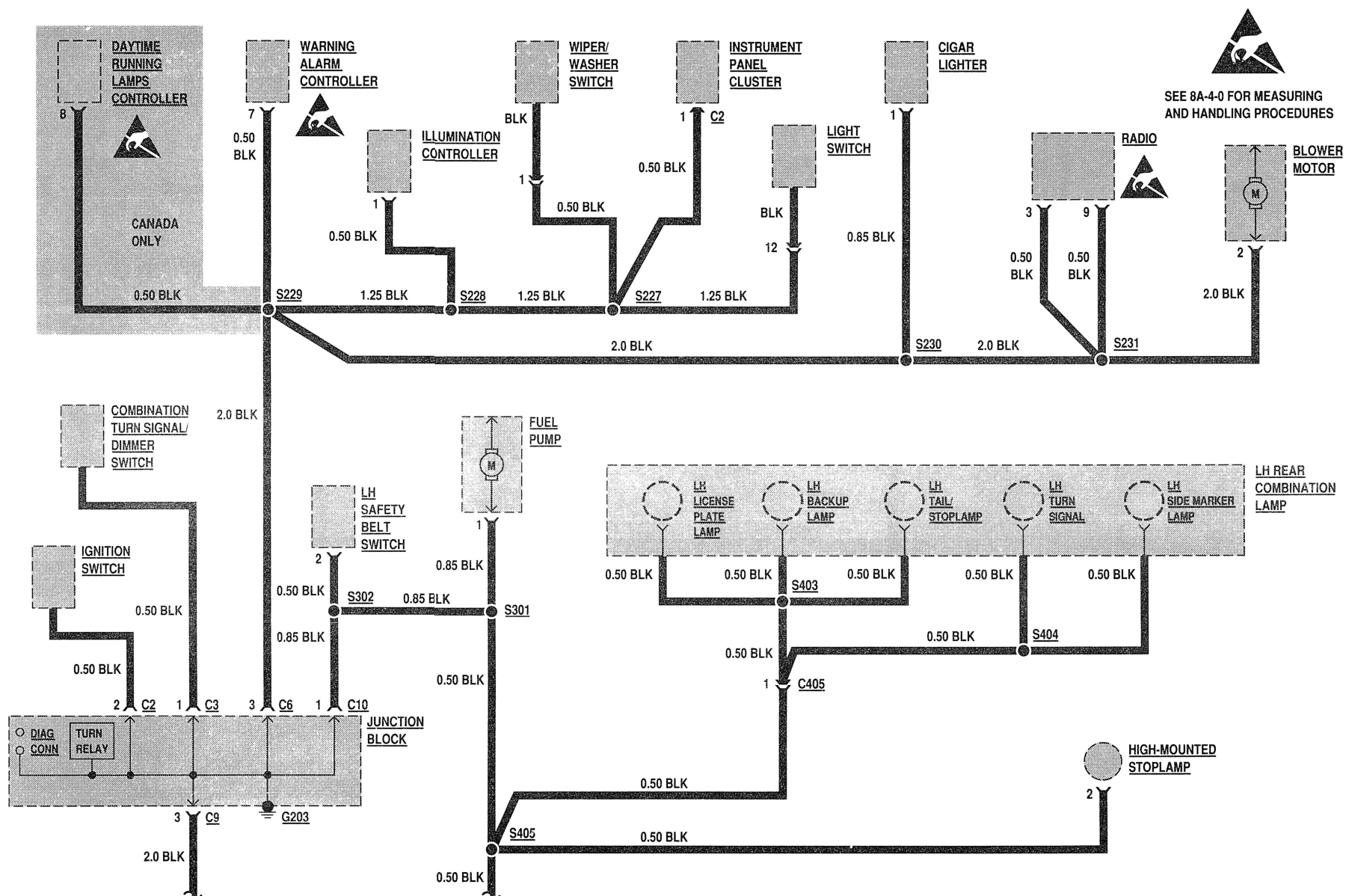


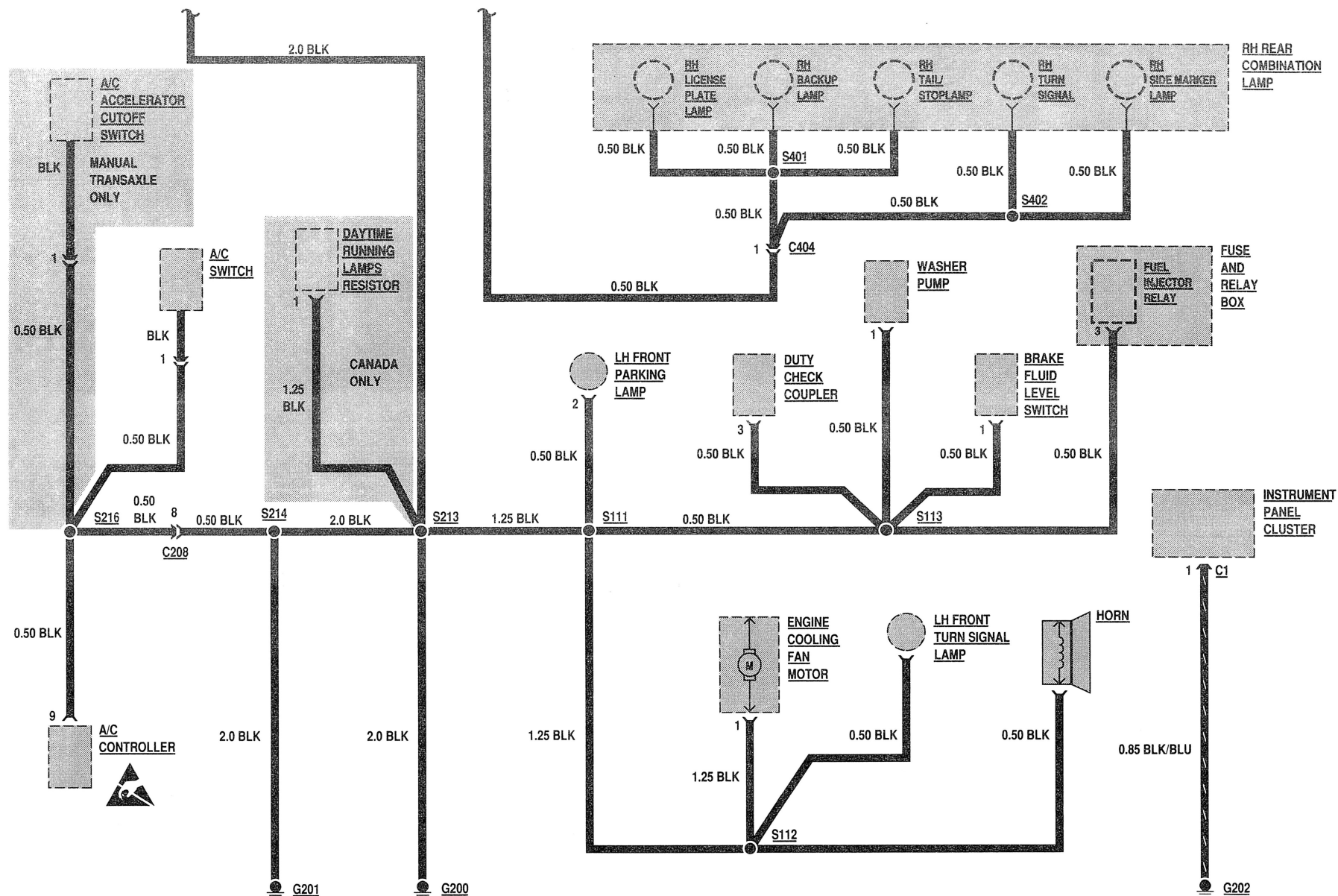
GROUND DISTRIBUTION: G102 AND G104



SEE 8A-4-0 FOR MEASURING AND HANDLING PROCEDURES

GROUND DISTRIBUTION: G200, G201, G202 AND G203



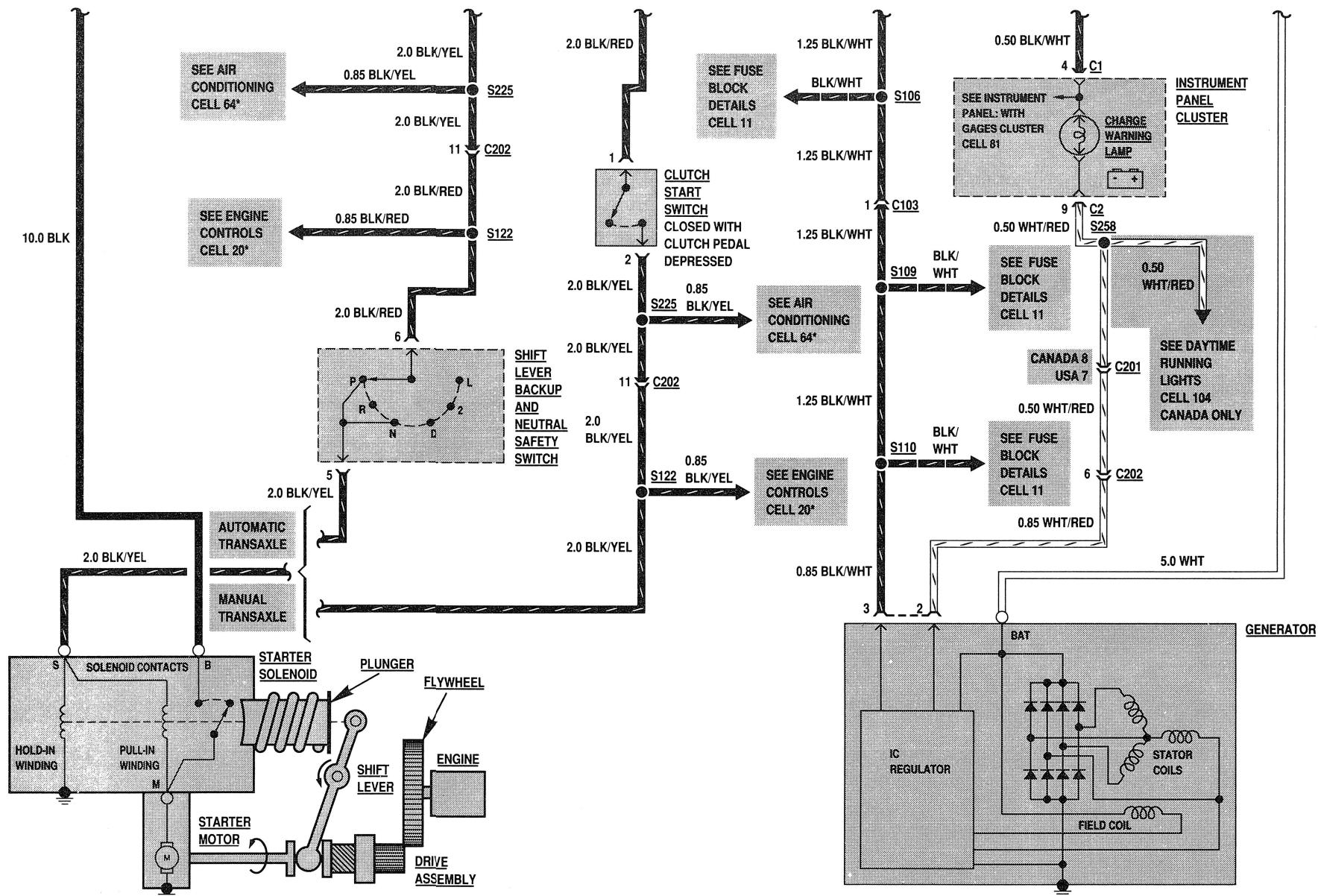


GROUND DISTRIBUTION

COMPONENT	LOCATION	FIGURE	CONNECTOR
A/C Accelerator Cutoff Switch (Manual Transaxle Only)	Mounted above Accelerator Pedal	201-05/A	
A/C Condenser Fan	RH side of Grille front of Radiator		
A/C Controller	Below RH I/P	201-05/A	202-00/B2
A/C Switch	Center of I/P below Radio	201-05/A	
Assembly Line Data Link (ALDL)	Below LH I/P	201-05/A	202-03/C2
Automatic Transaxle Controller	Below I/P left of Steering Column	201-05/A	
C1 (14 Cavities)	Engine Harness to A/T Controller below I/P left of Steering Column	201-05/A	202-01/C2
Battery	LH side of Engine Compartment	201-01/A	
Blower Motor	Behind RH I/P	201-04/B	
Brake Fluid Level Switch	In Brake Fluid Reservoir	201-04/A	
Cigar Lighter	Center of I/P below Radio	201-04/B	
Combination Turn Signal/Dimmer Switch	LH side of Steering Column		202-02/B3
Daytime Running Lamps Controller	LH side of I/P Cluster	201-04/B	202-02/C2
Daytime Running Lamps Resistor	Inside LH Front Fender		
Diagnostic Energy Reserve Module (DERM)	Behind I/P right of Steering Column	201-05/A	202-03/C1
Diagnostic Switch	Below I/P right of Steering Column	201-05/A	
Duty Check Coupler	LH Rear Engine Compartment front of Resistor	201-04/A	202-00/A1
Engine Control Module	Below I/P left of Steering Column	201-05/A	
C1 (12 Cavities)	Engine Harness to ECM, below LH I/P left of Steering Column	201-05/A	202-01/B3
C2 (18 Cavities)	Engine Harness to ECM, below LH I/P left of Steering Column	201-05/A	202-01/A2
Engine Cooling Fan Motor	LH Front Engine Compartment behind Radiator	201-01/A	
Forward Discriminating Sensor	Front of Vehicle behind A/C Condenser Fan	201-02/B	
Fuel Pump	In Fuel Tank	201-06/A	
Fuse and Relay Box	LH Engine Compartment behind Battery		
High-Mounted Stoplamp	Center of Rear Deck Lid		
Horn	LH Front Engine Compartment behind Grille	201-01/A	
Ignition Switch	RH side of Steering Column		
Illumination Controller	LH I/P left of Steering Column	201-04/B	
Instrument Panel Cluster	LH Dash	201-04/B	
C1 (10 Terminals)	I/P Harness to I/P Cluster, behind upper RH corner of I/P Cluster	201-04/B	81-08
C2 (12 Terminals)	I/P Harness to I/P Cluster, behind upper LH corner of I/P Cluster	201-04/B	81-08
Junction Block	Under LH I/P	201-07/B	
C2 (4 Cavities)	Ignition Switch to Junction Block, behind LH I/P		202-02/B2

GROUND DISTRIBUTION

COMPONENT	LOCATION	FIGURE	CONNECTOR
Junction Block (Continued)			
C3 (6 Cavities)	Combination Switch to Junction Block, behind LH I/P		202-00/A2
C6 (3 Cavities)	I/P Harness to Junction Block, behind LH I/P		
C9 (6 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/A1
C10 (6 Cavities)	Floor Harness to Junction Block, behind LH I/P	201-06/A	202-00/A2
LH Front Parking Lamp	LH front corner of Vehicle	201-01/A	
LH Front Turn Signal Lamp	LH front corner of Vehicle	201-01/A	
LH Rear Combination Lamp	LH rear corner of Vehicle	201-07/A	
LH Safety Belt Switch	In LH Safety Belt Buckle	201-06/A	
Light Switch	LH side of Cluster Switch Panel	201-04/B	202-00/B2
Passenger Compartment Discriminating Sensor	Behind I/P right of Steering Column	201-05/A	
Radio	Center of I/P	201-04/B	202-00/C1
RH Front Parking Lamp	RH front corner of Vehicle	201-02/B	
RH Front Turn Signal Lamp	RH front corner of Vehicle	201-02/B	
RH Rear Combination Lamp	RH rear corner of Vehicle	201-07/A	
Shift Lever Backup and Neutral Safety Switch			
(Automatic Transaxle Only)	Center Engine Compartment above Transaxle	201-02/A	202-01/B2
Warning Alarm Controller	Lower I/P left of Steering Column	201-04/B	202-02/A2
Washer Pump	LH front Engine Compartment under Washer Fluid Reservoir	201-01/A	
Wiper/Washer Switch	RH side of Cluster Switch Panel	201-04/B	202-02/A1
C208 (8 Cavities)	Main Harness to Inner A/C Harness, behind Center I/P	201-05/A	202-02/A1
C404 (6 Cavities)	Floor Harness to RH Rear Combination Lamp, at front of RH Rear Lamp Assembly	201-07/A	202-00/A3
C405 (6 Cavities)	Floor Harness to LH Rear Combination Lamp, at front of LH Rear Lamp Assembly	201-07/A	202-00/A3
S111	Main Harness, at base of LH Front Parking Lamp Branch	201-01/A	
S112	Main Harness, near Engine Cooling Fan Motor	201-01/A	
S113	Main Harness, at base of Horn Relay Branch	201-01/A	
S115	Engine Harness, at base of Distributor Branch	201-00/A	
S116	Engine Harness, in Engine Compartment near Grommet	201-04/A	
S117	Outer A/C Harness, near RH Headlamp		
S118	Main Harness, in RH Headlamp Branch	201-02/B	
S121	Engine Harness, center of ECM Harness Branch		
S213	Main Harness, near Junction Block	201-05/A	
S214	Main Harness, near RH Kick Panel	201-05/A	



* Refer to 1990 Geo METRO ELECTRICAL DIAGNOSIS SERVICE MANUAL SUPPLEMENT (ST370-90 EDM)

STARTER AND CHARGING

COMPONENT	LOCATION	FIGURE	CONNECTOR
Battery	LH side of Engine Compartment	201-01/A	
Clutch Start Switch (Manual Transaxle Only)	Center Engine Compartment above Transaxle	201-05/A	
Fuse and Relay Box	LH Engine Compartment behind Battery		
C1 (1 Cavity)	Generator to Fuse and Relay Box, below Fuse and Relay Box	201-01/A	
C2 (1 Cavity)	Battery Positive (+) to Fuse and Relay Box, below Fuse and Relay Box	201-01/A	
C3 (2 Cavities)	Main Harness to Fuse and Relay Box, below Fuse and Relay Box		
Generator	Right rear of Engine	201-00/A	
Ignition Switch	RH side of Steering Column		
Instrument Panel Cluster	LH Dash	201-04/B	
C1 (10 Terminals)	I/P Harness to I/P Cluster, behind upper RH corner of I/P Cluster	201-04/B	81-08
C2 (12 Terminals)	I/P Harness to I/P Cluster, behind upper LH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH I/P	201-07/B	
C1 (5 Cavities)	Ignition Switch to Junction Block, behind LH I/P	201-07/B	202-02/B1
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
C7 (2 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	
C9 (6 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/A1
Shift Lever Backup and Neutral Safety Switch (Automatic Transaxle Only)	Center Engine Compartment above Transaxle	201-02/A	202-01/B2
Starter Motor	Center rear of Engine	201-00/A	
C103 (8 Cavities)	Main Harness to Engine Harness, Engine Compartment between Battery and Strut Tower	201-02/A	202-01/C1
C201 (18 Cavities) (USA)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/A3
C201 (20 Cavities) (Canada)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/C3
C202 (15 Cavities)	Main Harness to Engine Harness, behind I/P near Junction Block	201-05/A	202-01/B1
S101	Main Harness, behind Coolant Reservoir		
S105	Main Harness, near LH Grommet	201-01/A	
S106	Main Harness, at base of LH Headlamp Branch near Grommet		
S109	Engine Harness, between Transaxle and Bulkhead		
S110	Engine Harness, near Distributor		

STARTER AND CHARGING

COMPONENT	LOCATION	FIGURE	CONNECTOR
S122	Engine Harness, near Fuel Injector		
S206	I/P Harness, behind I/P above Warning Alarm Controller	201-04/B	
S225	Main Harness, at base of Engine Harness Branch	201-05/A	
S256	Ignition Switch Jumper, behind LH I/P	201-07/B	
S258	I/P Harness, above Junction Block	201-04/B	
G100	Mounted on Transaxle	201-02/A	
G101	LH Front Inner Fender	201-01/A	

TROUBLESHOOTING HINTS

- Check the hydrometer eye that is built into the BATTERY before troubleshooting the Starter or Charging System.
 - Green Eye - BATTERY is charged.
 - Dark Eye - BATTERY is discharged. Recharge BATTERY.
- Check BATTERY for overcharge conditions such as spewing of electrolyte or yellowing of BATTERY case. If any of these conditions are present, refer to BATTERY (SEC.6D1).
- Check that all STARTER assembly connections are clean and tight.
- Check that G100 and G101 are clean and tight.

SYSTEM DIAGNOSIS

STARTER AND CHARGING SYSTEM		DIAGNOSTIC CHART A	
TEST		RESULT	ACTION
A1.	Place gear selector in "P" or "N" (Automatic Transaxle) or depress clutch pedal (Manual Transaxle). Turn IGNITION SWITCH to "START."	ENGINE does not crank and STARTER SOLENOID does not click.	GO TO A2.
		ENGINE does not crank or cranks slowly and STARTER SOLENOID clicks.	GO TO A12.
A2.	Connect a test lamp from STARTER SOLENOID terminal S to chassis ground. Depress clutch if vehicle equipped with manual transaxle. Turn IGNITION SWITCH to "START."	Test lamp lights.	Replace STARTER SOLENOID.
		Test lamp does not light.	GO TO A3 (Manual Transaxle). GO TO A9 (Automatic Transaxle).
A3.	Backprobe CLUTCH START SWITCH connector with a test lamp from cavity 2 to chassis ground. Turn IGNITION SWITCH to "START" and depress clutch pedal.	Test lamp lights.	Repair open in BLK/YEL wire between CLUTCH START SWITCH and STARTER SOLENOID.
		Test lamp does not light.	GO TO A4.

STARTER AND CHARGING

SYSTEM DIAGNOSIS

STARTER AND CHARGING SYSTEM		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A4.	Backprobe CLUTCH START SWITCH connector with a test lamp from cavity 1 to chassis ground. Turn IGNITION SWITCH to "START."	Test lamp lights.	Replace CLUTCH START SWITCH.
		Test lamp does not light.	GO TO A5.
A5.	Backprobe JUNCTION BLOCK connector C9 with a test lamp from cavity 5 to chassis ground. Turn IGNITION SWITCH to "START."	Test lamp lights.	Repair open in BLK/RED wire between JUNCTION BLOCK and CLUTCH START SWITCH.
		Test lamp does not light.	GO TO A6.
A6.	Backprobe JUNCTION BLOCK connector C1 with a test lamp from cavity 3 to chassis ground. Turn IGNITION SWITCH to "START."	Test lamp lights.	Replace JUNCTION BLOCK.
		Test lamp does not light.	GO TO A7.
A7.	Backprobe JUNCTION BLOCK connector C1 with a test lamp from cavity 4 to chassis ground.	Test lamp lights.	Replace IGNITION SWITCH.
		Test lamp does not light.	GO TO A8.
A8.	Backprobe JUNCTION BLOCK connector C9 with a test lamp from cavity 2 to chassis ground.	Test lamp does not light.	Repair open in WHT/GRN wire between JUNCTION BLOCK and FUSE AND RELAY BOX.
		Test lamp lights.	Replace JUNCTION BLOCK.
A9.	Backprobe SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH connector with a test lamp from cavity 5 to chassis ground. Place shift lever in "P" and turn IGNITION SWITCH to "START."	Test lamp lights.	Repair open in BLK/YEL wire between SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH and STARTER SOLENOID.
		Test lamp does not light.	GO TO A10.
A10.	Backprobe SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH connector with a test lamp from cavity 6 to chassis ground. Turn IGNITION SWITCH to "START."	Test lamp lights.	Replace SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH.
		Test lamp does not light.	GO TO A11.
A11.	Backprobe JUNCTION BLOCK connector C9 with a test lamp from cavity 5 to chassis ground. Turn IGNITION SWITCH to "START."	Test lamp lights.	Repair open in BLK/YEL or BLK/RED wire between JUNCTION BLOCK and SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH.
		Test lamp does not light.	GO TO A6.
A12.	Using a digital multimeter, measure voltage across BATTERY while cranking ENGINE.	Less than 9.6 volts.	GO TO A13.
		More than 9.6 volts.	GO TO A14.

STARTER AND CHARGING

SYSTEM DIAGNOSIS

STARTER AND CHARGING SYSTEM		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A13.	Perform Battery Load Test. Refer to BATTERY (SEC.6D1).*	Battery defective.	Replace Battery.
		Battery good.	Repair STARTER MOTOR. Refer to CRANKING SYSTEM (SEC. 6D2).*
A14.	Turn IGNITION SWITCH to "START." Using a digital multimeter, measure voltage drop between battery negative (-) post and engine block and battery positive (+) post and STARTER SOLENOID terminal S.	Voltage drop through either cable more than 0.5 volts.	Replace BATTERY cables.
		Voltage drop through both cables less than 0.5 volts.	Repair STARTER MOTOR. Refer to CRANKING SYSTEM (SEC. 6D2).*

SYSTEM DIAGNOSIS

STARTER AND CHARGING SYSTEM		DIAGNOSTIC CHART B	
NOTE: BATTERY MUST BE IN CHARGED STATE BEFORE CONTINUING DIAGNOSIS.			
TEST		RESULT	ACTION
B1.	Turn IGNITION SWITCH to “ON.”	Charge Warning Lamp lights.	GO TO B2.
		Charge Warning Lamp does not light.	GO TO B4.
B2.	Start ENGINE.	Charge Warning Lamp goes out.	GO TO B3.
		Charge Warning Lamp remains lit.	GO TO B7.
B3.	Using a digital multimeter, measure voltage across BATTERY terminals with engine running at fast idle.	Voltage between 13.5 and 15.5 volts.	All systems diagnosed in this cell are functioning normally.
		Voltage less than 13.5 or more than 15.5 volts.	Repair GENERATOR . Refer to CHARGING SYSTEM (SEC.6D3).*
B4.	Remove GENERATOR connector. Connect a fused jumper from GENERATOR connector cavity 2 to chassis ground.	Charge Warning Lamp lights.	GO TO B5.
		Charge Warning Lamp does not light.	GO TO B6.
B5.	Connect a test lamp from GENERATOR connector cavity 3 to chassis ground.	Test lamp lights.	Remove GENERATOR and replace IC Regulator. Refer to CHARGING SYSTEM (SEC.6D3).*
		Test lamp does not light.	Repair open in BLK/WHT wire between JUNCTION BLOCK and GENERATOR.

* Refer to 1990 Geo METRO SERVICE MANUAL (ST370-90)

STARTER AND CHARGING

SYSTEM DIAGNOSIS

STARTER AND CHARGING SYSTEM		DIAGNOSTIC CHART B (CONT'D)	
TEST		RESULT	ACTION
B6.	Backprobe INSTRUMENT PANEL CLUSTER connector C1 with a test lamp from terminal 4 to chassis ground.	Test lamp does not light.	Repair open in BLK/WHT wire between JUNCTION BLOCK and INSTRUMENT PANEL CLUSTER.
		Test lamp lights.	Repair open in WHT/RED wire between INSTRUMENT PANEL CLUSTER and GENERATOR or in INSTRUMENT PANEL CLUSTER printed circuit.
B7.	Turn IGNITION SWITCH to "OFF." Remove GENERATOR connector. Turn IGNITION SWITCH to "ON."	Charge Warning Lamp remains lit.	Repair short to ground in WHT/RED wire between GENERATOR and INSTRUMENT PANEL CLUSTER or in INSTRUMENT PANEL CLUSTER printed circuit.
		Charge Warning Lamp goes out.	Remove GENERATOR and replace IC Regulator. Refer to CHARGING SYSTEM (SEC.6D3).*

* Refer to 1990 Geo METRO SERVICE MANUAL (ST370-90)

CIRCUIT OPERATION

STARTING SYSTEM

In the basic circuit, the STARTER SOLENOID windings are energized when the IGNITION SWITCH is turned to "START" and the CLUTCH START SWITCH/SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH is closed. (The CLUTCH START SWITCH, installed on manual transaxle equipped vehicles, provides voltage to the STARTER SOLENOID windings when the clutch pedal is depressed. The SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH, installed on

automatic transaxle equipped vehicles, provides voltage to the STARTER SOLENOID windings when the selector lever is in the "PARK" or "NEUTRAL" position.) The resulting PLUNGER and SHIFT LEVER movement causes the DRIVE PINION to engage the engine FLYWHEEL ring gear. This movement also causes the STARTER SOLENOID contacts to close. With the contacts closed, the STARTER SOLENOID provides a closed circuit between the BATTERY positive (+) terminal and the STARTER assembly. Because the STARTER assembly is permanently grounded to the engine block, the circuit is

complete and cranking occurs as soon as the STARTER SOLENOID contacts close. When the engine starts, the drive assembly is designed to overrun and protect the armature from excessive speed until the IGNITION SWITCH is released from the "START" position. With the IGNITION SWITCH released, voltage is removed from the STARTER SOLENOID, and the windings de-energize. When the solenoid de-energizes, the return spring in the STARTER SOLENOID forces the contacts open, breaks the circuit between the BATTERY and the STARTER SOLENOID, and disengages the DRIVE ASSEMBLY.

STARTER AND CHARGING

CHARGING SYSTEM

The GENERATOR provides DC voltage to operate the vehicle's electrical systems and to recharge the BATTERY. The voltage output of the GENERATOR is controlled by a built-in IC Regulator.

When the IGNITION SWITCH is moved to "ON," battery voltage is applied through the Ignition Fuse and the Charge Warning Lamp to the IC Regulator in the GENERATOR. When the GENERATOR is not rotating, the IC Regulator provides a ground and causes the Charge Warning Lamp to light. Voltage from the Ignition

Fuse also generates a magnetic field around the Field Coil. As the engine starts and the GENERATOR begins to rotate, a voltage is also generated in the Stator. The IC Regulator senses this voltage and takes control of the field current.

AC voltage is generated in the three Stator Coils. This AC voltage is converted to DC voltage in the Rectifier Bridge. The DC output, after being regulated by the IC Regulator, is applied to the vehicle's BATTERY and electrical supply circuits at the BAT terminal of the GENERATOR. A separate output voltage is provided to the

Charge Warning Lamp. Since equal voltage is now being applied to both sides of the Charge Warning Lamp, the lamp loses its ground and goes out.

The IC Regulator is also connected to battery voltage through the GENERATOR BAT terminal. When the BATTERY is fully charged, the IC Regulator decreases field excitation. This reduces the output of the GENERATOR to prevent overcharging. When the BATTERY has been discharged or is heavily loaded, the IC Regulator increases the field excitation and voltage output of the GENERATOR.



BRAKE WARNING

COMPONENT	LOCATION	FIGURE	CONNECTOR
Brake Fluid Level Switch	In Brake Fluid Reservoir	201-04/A	
Daytime Running Lamps Controller	LH side of I/P Cluster	201-04/B	202-02/C2
Ignition Switch	RH side of Steering Column		
Instrument Panel Cluster	LH Dash	201-04/B	
C1 (10 Terminals)	I/P Harness to I/P Cluster, behind upper RH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH I/P	201-07/B	
C2 (4 Cavities)	Ignition Switch to Junction Block, behind LH I/P		202-02/B2
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
Parking Brake Switch	Passenger Compartment behind Gear Selector	201-06/A	
C201 (18 Cavities)			
(USA)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/A3
C201 (20 Cavities)			
(Canada)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/C3
C203 (12 Cavities)	I/P Harness to Floor Harness, near Junction Block	201-06/A	202-00/B2
S111	Main Harness, at base of LH Front Parking Lamp Branch	201-01/A	
S113	Main Harness, at base of Horn Relay Branch	201-01/A	
S206	I/P Harness, behind I/P above Warning Alarm Controller	201-04/B	
S213	Main Harness, near Junction Block	201-05/A	
S232	I/P Harness, behind LH I/P near Junction Block	201-04/B	
G101	LH Front Inner Fender	201-01/A	
G200	LH I/P above Kick Panel	201-05/A	
G203	Junction Block Case Ground, under LH I/P	201-08/A	

TROUBLESHOOTING HINTS

1. Check Ignition Fuse with a fuse tester.
2. Check that brake fluid reservoir is adequately filled.
3. Check that G101, G200 and G203 are clean and tight.

BRAKE WARNING

SYSTEM DIAGNOSIS

BRAKE WARNING		DIAGNOSTIC CHART A	
TEST		RESULT	ACTION
A1.	With parking brake released, turn IGNITION SWITCH slowly past "ON" to "BULB TEST" position and release to "ON" position.	"BRAKE" Indicator Lamp lights and goes out.	GO TO A2.
		"BRAKE" Indicator Lamp does not light.	GO TO A4.
		"BRAKE" Indicator Lamp remains lit.	GO TO A15.
A2.	Engage parking brake.	"BRAKE" Indicator Lamp lights.	Release parking brake and GO TO A3.
		"BRAKE" Indicator Lamp does not light.	GO TO A9.
A3.	Remove brake fluid reservoir cap and manually hold float down (BRAKE FLUID LEVEL SWITCH closed).	"BRAKE" Indicator Lamp lights.	All systems diagnosed in this cell are functioning normally.
		"BRAKE" Indicator Lamp does not light.	GO TO A13.
A4.	Disconnect JUNCTION BLOCK connector C2. Connect a digital multimeter from JUNCTION BLOCK terminal 3 to chassis ground. Measure resistance.	More than 0.3 ohms.	Replace JUNCTION BLOCK.
		Less than 0.3 ohms.	GO TO A5.
A5.	Connect a digital multimeter from JUNCTION BLOCK connector C2 cavity 3 to cavity 1. Measure resistance with IGNITION SWITCH in "BULB TEST" position.	More than 0.3 ohms.	Replace IGNITION SWITCH.
		Less than 0.3 ohms.	GO TO A6.
A6.	Reconnect JUNCTION BLOCK connector C2. Backprobe JUNCTION BLOCK connector C5 with a test lamp from cavity 11 to chassis ground.	Test lamp lights dimly.	Replace JUNCTION BLOCK.
		Test lamp does not light.	GO TO A7.
A7.	Backprobe INSTRUMENT PANEL CLUSTER connector C1 with a test lamp from terminal 7 to chassis ground.	Test lamp lights dimly.	Repair open in BRN/BLK wire.
		Test lamp does not light.	GO TO A8.
A8.	Backprobe INSTRUMENT PANEL CLUSTER connector C1 with a test lamp from terminal 4 to chassis ground.	Test lamp lights.	Repair open in INSTRUMENT PANEL CLUSTER printed circuit .
		Test lamp does not light.	Repair open in BLK/WHT wire between JUNCTION BLOCK and INSTRUMENT PANEL CLUSTER.

BRAKE WARNING

SYSTEM DIAGNOSIS

BRAKE WARNING		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A9.	Disconnect PARKING BRAKE SWITCH connector. Connect a digital multimeter from PARKING BRAKE SWITCH terminal 1 to chassis ground. Measure resistance.	More than 0.3 ohms.	Replace PARKING BRAKE SWITCH.
		Less than 0.3 ohms	USA MODELS: Repair open in RED/BLK wire between INSTRUMENT PANEL CLUSTER and C203 or in PPL/GRN wire between C203 and PARKING BRAKE SWITCH. CANADA MODELS: GO TO A10.
A10.	Disconnect DAYTIME RUNNING LAMPS CONTROLLER connector. Connect a digital multimeter from connector cavity 4 to PARKING BRAKE SWITCH connector cavity. Measure resistance.	More than 0.3 ohms.	Repair open in PPL/GRN wire between PARKING BRAKE SWITCH and DAYTIME RUNNING LAMPS CONTROLLER.
		Less than 0.3 ohms.	GO TO A23.
A11.	Connect a fused jumper from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 10 to chassis ground.	"BRAKE" Indicator Lamp lights.	Replace DAYTIME RUNNING LAMPS CONTROLLER.
		"BRAKE" Indicator Lamp does not light.	Remove jumper and GO TO A12.
A12.	Backprobe INSTRUMENT PANEL CLUSTER connector C1 with a fused jumper from terminal 5 to chassis ground.	"BRAKE" Indicator Lamp lights.	Repair open in RED/BLK wire between INSTRUMENT PANEL CLUSTER and DAYTIME RUNNING LAMPS CONTROLLER.
		"BRAKE" Indicator Lamp does not light.	Repair open in INSTRUMENT PANEL CLUSTER printed circuit.
A13.	Disconnect BRAKE FLUID LEVEL SWITCH connector. Connect a digital multimeter from connector cavity 1 to chassis ground. Measure resistance.	More than 0.3 ohms.	Repair BLK ground wire.
		Less than 0.3 ohms.	GO TO A14.
A14.	Connect a test lamp from BRAKE FLUID LEVEL SWITCH connector cavity 2 to chassis ground.	Test lamp lights dimly.	Replace BRAKE FLUID LEVEL SWITCH.
		Test lamp does not light.	Repair open in RED/BLK wire between BRAKE FLUID LEVEL SWITCH and S232.
A15.	Disconnect PARKING BRAKE SWITCH connector.	"BRAKE" Indicator Lamp goes out.	Replace PARKING BRAKE SWITCH.
		"BRAKE" Indicator Lamp remains lit.	CANADA MODELS: GO TO A16. USA MODELS: GO TO A18.

BRAKE WARNING

SYSTEM DIAGNOSIS

BRAKE WARNING		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A16.	Disconnect DAYTIME RUNNING LAMPS CONTROLLER connector.	"BRAKE" Indicator Lamp goes out.	GO TO A17.
		"BRAKE" Indicator Lamp remains lit.	GO TO A18.
A17.	Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 4 to chassis ground. Measure resistance.	Less than infinite.	Repair short to ground in PPL/GRN wire.
		Infinite.	Replace DAYTIME RUNNING LAMPS CONTROLLER.
A18.	Disconnect BRAKE FLUID LEVEL SWITCH connector.	"BRAKE" Indicator Lamp goes out.	Replace BRAKE FLUID LEVEL SWITCH.
		"BRAKE" Indicator Lamp remains lit.	GO TO A19.
A19.	Disconnect INSTRUMENT PANEL CLUSTER connector C1. Connect a digital multimeter from connector terminal 5 to chassis ground. Measure resistance.	Less than infinite.	Repair short to ground in RED/BLK wire between INSTRUMENT PANEL CLUSTER and BRAKE FLUID LEVEL SWITCH, PARKING BRAKE SWITCH, or DAYTIME RUNNING LAMPS CONTROLLER (CANADA).
		Infinite.	GO TO A20.
A20.	Disconnect INSTRUMENT PANEL CLUSTER connector C1 and JUNCTION BLOCK connector C5. Connect a digital multimeter from INSTRUMENT PANEL CLUSTER connector C1 terminal 7 to chassis ground. Measure resistance.	Less than infinite.	Repair short to ground in BRN/BLK wire between INSTRUMENT PANEL CLUSTER and JUNCTION BLOCK.
		Infinite.	GO TO A21.
A21.	Disconnect JUNCTION BLOCK connector C2. Connect a digital multimeter from cavity 3 to cavity 1. Measure resistance.	Less than infinite.	Replace IGNITION SWITCH.
		Infinite.	GO TO A22.
A22.	Connect a digital multimeter from terminal 1 (male side of C2 at JUNCTION BLOCK) to chassis ground. Measure resistance.	More than infinite.	Repair short to ground in INSTRUMENT PANEL CLUSTER printed circuit.
		Infinite.	Replace JUNCTION BLOCK.
A23.	Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 8 to chassis ground. Measure resistance.	More than 0.3 ohms.	GO TO A24.
		Less than 0.3 ohms.	GO TO A25.

BRAKE WARNING**SYSTEM DIAGNOSIS**

BRAKE WARNING		DIAGNOSTIC CHART A (CONT'D)	
	TEST	RESULT	ACTION
A24.	Backprobe JUNCTION BLOCK connector C5 with a digital multimeter from cavity 3 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in BLK ground wire between DAYTIME RUNNING LAMPS CONTROLLER and JUNCTION BLOCK.
		More than 0.3 ohms.	Replace JUNCTION BLOCK.
A25.	Connect a test lamp from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 7 to chassis ground.	Test lamp does not light.	Repair open in BLK/WHT wire between DAYTIME RUNNING LAMPS CONTROLLER and S206.
		Test lamp lights.	GO TO A11 .

CIRCUIT OPERATION

The "BRAKE" Indicator Lamp, when lit, alerts the driver to two possible conditions: 1) the parking brake is applied or 2) there is insufficient brake fluid in the brake fluid reservoir.

When the IGNITION SWITCH is in "ON," "BULB TEST" or "START," voltage is applied through the Ignition Fuse and "BRAKE" Indicator Lamp, to the

PARKING BRAKE SWITCH and the BRAKE FLUID LEVEL SWITCH (USA). Voltage is applied through the Ignition Fuse and "BRAKE" Indicator Lamp, to the BRAKE FLUID LEVEL SWITCH and the DAYTIME RUNNING LAMPS CONTROLLER in the Canadian model. When one or both of the switches are closed, a path to ground is completed and the "BRAKE" Indicator Lamp lights. The BRAKE FLUID

LEVEL SWITCH closes when the level of brake fluid in the brake fluid reservoir is low. The PARKING BRAKE SWITCH closes whenever the parking brake is applied.

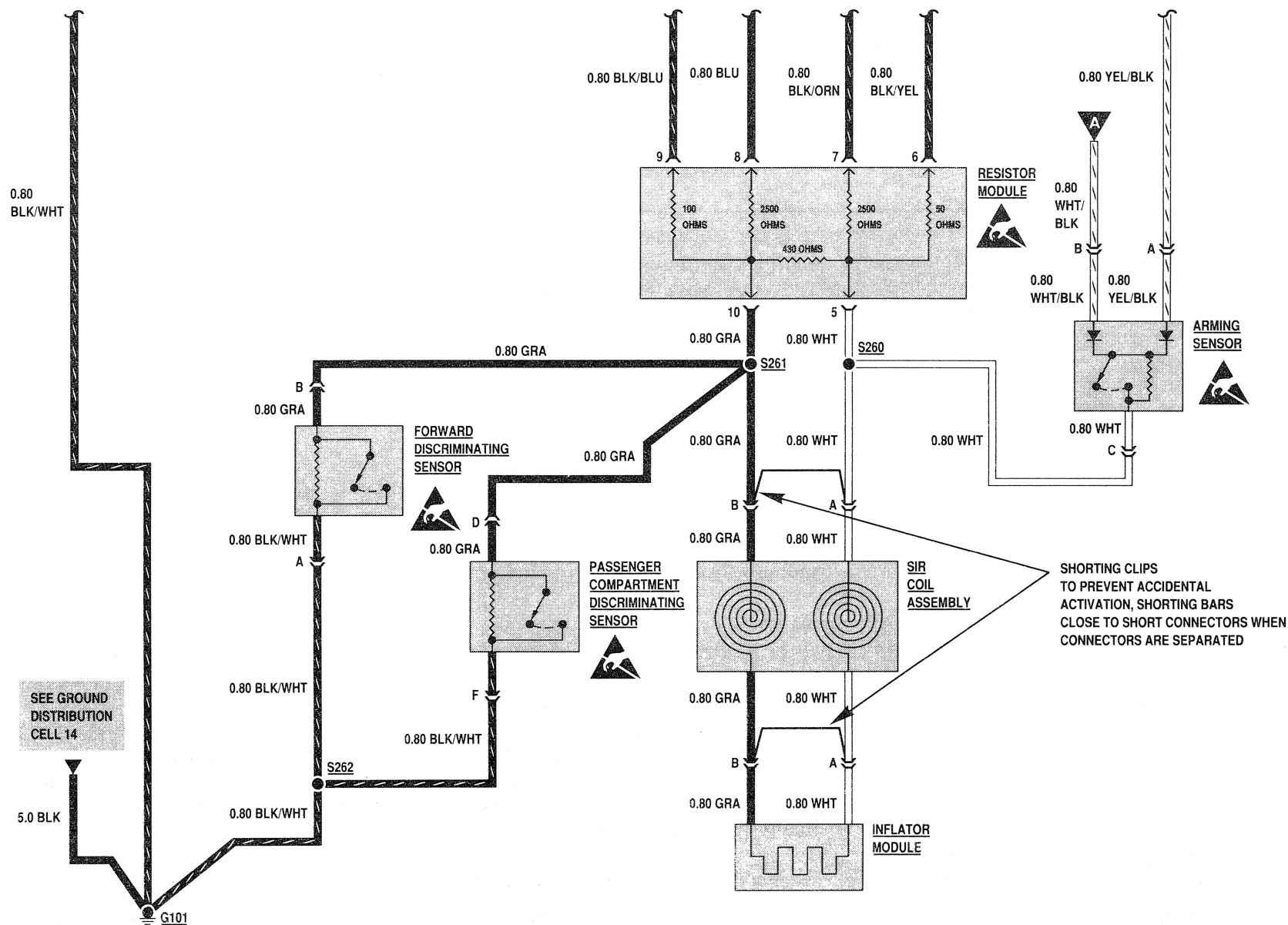
The "BRAKE" Indicator Lamp circuit is tested whenever the IGNITION SWITCH is in the "BULB TEST" or "START" position. In these instances, the "BRAKE" Indicator Lamp is grounded through the IGNITION SWITCH to G203.



SEE 8A-4-0 FOR MEASURING
AND HANDLING PROCEDURES

8A-47-0 ELECTRICAL DIAGNOSIS

METRO CONVERTIBLE



SUPPLEMENTAL INFLATABLE RESTRAINT

COMPONENT	LOCATION	FIGURE	CONNECTOR
Arming Sensor	Behind RH I/P	201-05/A	
Assembly Line Data Link (ALDL)	Below LH I/P	201-05/A	202-03/C2
Diagnostic Energy Reserve Module (DERM)	Behind I/P right of Steering Column	201-05/A	202-03/C1
Forward Discriminating Sensor	Front of vehicle behind A/C Condenser Fan	201-02/B	
Inflator Module	In Steering Column		
Instrument Panel Cluster	LH Dash	201-04/B	
C1 (10 Terminals)	I/P Harness to I/P Cluster, behind upper RH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH I/P	201-07/B	
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
C7 (2 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	
Passenger Compartment			
Discriminating Sensor	Behind I/P right of Steering Column	201-05/A	
Resistor Module	Behind I/P right of Steering Column	201-05/A	202-03/B3
SIR Coil Assembly	In Steering Column attached to Combination Switch		
SIR Fuse Box	Below LH I/P attached to Junction Block	201-07/B	
C217 (2 Cavities)	SIR Harness to Main Harness, behind upper LH corner of I/P	201-05/A	
C218 (3 Cavities)	SIR Harness to I/P Harness, below LH I/P near Junction Block	201-05/A	
S105	Main Harness, between Fuse and Relay Box and LH Grommet	201-01/A	
S206	I/P Harness, behind I/P above Warning Alarm Controller	201-04/B	
S257	SIR Harness, behind I/P right of Steering Column	201-05/A	
S260	SIR Harness, behind I/P right of Steering Column	201-05/A	
S261	SIR Harness, behind I/P right of Steering Column	201-05/A	
S262	SIR Harness, behind RH I/P	201-05/A	
S263	SIR Harness, behind I/P left of Steering Column	201-05/A	
G101	LH Front Inner Fender	201-01/A	

SYSTEM DIAGNOSIS

For diagnosis of the Supplemental Inflatable Restraint (SIR) System, refer to SUPPLEMENTAL INFLATABLE RESTRAINT (SIR) SYSTEM DIAGNOSIS (SEC. 9J-A).

CIRCUIT OPERATION

For a detailed description of the Supplemental Inflatable Restraint System, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM (SIR) (SEC. 9J).

BLANK



SEE 8A-4-0 FOR MEASURING
AND HANDLING PROCEDURES

***Refer to 1990 Geo METRO ELECTRICAL DIAGNOSIS SERVICE MANUAL SUPPLEMENT (ST370-90EDM).**

AUDIBLE WARNINGS

COMPONENT	LOCATION	FIGURE	CONNECTOR
Ignition Key Warning Switch	RH side of Steering Column in Ignition Switch		
Instrument Panel Cluster	LH Dash	201-04/A	
C1 (10 Terminals)	I/P Harness to I/P Cluster, behind upper RH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH I/P	201-07/B	
C2 (4 Cavities)	Ignition Switch to Junction Block, behind LH I/P		202-02/B2
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
C6 (3 Cavities)	I/P Harness to Junction Block, behind LH I/P		
C10 (6 Cavities)	Floor Harness to Junction Block, behind LH I/P		202-00/A2
LH Door Switch	LH Door Frame	201-06/A	
LH Safety Belt Switch	In LH Safety Belt Buckle	201-06/A	
Light Switch	LH side of Cluster Switch Panel	201-04/B	202-00/B2
Warning Alarm Controller	Lower I/P left of Steering Column	201-04/B	202-02/A2
C201 (20 Cavities) (Canada)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/C3
C201 (18 Cavities) (USA)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/A3
C203 (12 Cavities)	I/P Harness to Floor Harness, near Junction Block	201-06/A	202-00/B2
C213 (10 Cavities)	Main Harness to Floor Harness, behind I/P near Junction Block	201-05/A	202-02/B3
S201	I/P Harness, behind LH I/P	201-04/B	
S206	I/P Harness, behind I/P above Warning Alarm Controller	201-04/B	
S207	I/P Harness, behind LH I/P	201-04/B	
S208	I/P Harness, behind LH I/P	201-04/B	
S211	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S226	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S229	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S240	Floor Harness, under LH I/P	201-06/A	
S241	Main Harness, near Junction Block	201-05/A	
S302	Floor Harness, near base of Safety Belt Switch Branch	201-06/A	
G203	Junction Block Case Ground, under LH I/P	201-08/A	

AUDIBLE WARNINGS

TROUBLESHOOTING HINTS

1. Check Tail Fuse by operating radio.
2. Check Ignition Fuse by turning ignition key to "ON" and observing "CHECK ENGINE" lamp.
3. Check that ground G203 is clean and tight.

SYSTEM DIAGNOSIS

AUDIBLE WARNINGS		DIAGNOSTIC CHART A	
TEST		RESULT	ACTION
A1.	Insert ignition key into ignition switch. Open LH door.	High-frequency alarm sounds.	GO TO A2.
		Alarm does not sound.	GO TO A8.
A2.	Close LH door.	Alarm stops.	GO TO A3.
		Alarm continues to sound.	GO TO A16.
A3.	Open LH door and remove ignition key.	Alarm does not sound.	GO TO A4.
		Alarm continues to sound after key has been removed.	GO TO A18.
A4.	Insert ignition key and turn ignition switch to "ON" with safety belt unbuckled.	Constant alarms sounds for several seconds.	GO TO A5.
		Alarm does not sound.	GO TO A21.
		Alarm sounds but Safety Belt Warning Lamp does not light.	GO TO A27.
A5.	Fasten safety belt while alarm is sounding.	Alarm stops.	GO TO A6.
		Alarm continues to sound.	GO TO A30.
		Alarm stops but Safety Belt Warning Lamp remains lit.	GO TO A32.
A6.	Turn LIGHT SWITCH to "PARK," remove ignition key, and open LH door.	Low-frequency alarm sounds.	GO TO A7.
		Alarm does not sound.	GO TO A34.
A7.	Turn LIGHT SWITCH to "OFF."	Alarm stops.	All systems diagnosed in this cell are functioning normally.
		Alarm continues to sound.	GO TO A37.

AUDIBLE WARNINGS

SYSTEM DIAGNOSIS

AUDIBLE WARNINGS		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A8.	Backprobe JUNCTION BLOCK connector C2 with a test lamp from cavity 4 to chassis ground.	Test lamp does not light.	Replace JUNCTION BLOCK.
		Test lamp lights.	GO TO A9.
A9.	Backprobe JUNCTION BLOCK connector C2 with a test lamp from cavity 3 to chassis ground.	Test lamp does not light.	Replace IGNITION KEY WARNING SWITCH.
		Test lamp lights.	GO TO A10.
A10.	Backprobe JUNCTION BLOCK connector C5 with a test lamp from cavity 8 to chassis ground.	Test lamp does not light.	Replace JUNCTION BLOCK.
		Test lamp lights.	GO TO A11.
A11.	Disconnect WARNING ALARM CONTROLLER connector. Connect a test lamp from WARNING ALARM CONTROLLER connector cavity 4 to chassis ground.	Test lamp does not light.	Repair open in BLU/BLK wire.
		Test lamp lights.	GO TO A12.
A12.	Connect a digital multimeter from WARNING ALARM CONTROLLER connector cavity 6 to chassis ground with LH door open. Measure resistance.	Less than 0.3 ohms.	GO TO A13.
		More than 0.3 ohms.	GO TO A15.
A13.	Connect a digital multimeter from WARNING ALARM CONTROLLER connector cavity 7 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace WARNING ALARM CONTROLLER.
		More than 0.3 ohms.	GO TO A14.
A14.	Backprobe JUNCTION BLOCK connector C6 with a digital multimeter from cavity 3 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in BLK wire between WARNING ALARM CONTROLLER and JUNCTION BLOCK.
		More than 0.3 ohms.	Replace JUNCTION BLOCK.
A15.	Remove LH DOOR SWITCH. Disconnect LH DOOR SWITCH connector. Connect a digital multimeter from switch terminal to switch housing. Measure resistance with switch plunger fully extended.	Less than 0.3 ohms.	Repair open in BLK/BLU wire between WARNING ALARM CONTROLLER and LH DOOR SWITCH.
		More than 0.3 ohms.	Replace LH DOOR SWITCH.
A16.	Open LH door and remove LH DOOR SWITCH.	Alarm stops.	Replace LH DOOR SWITCH.
		Alarm continues to sound.	GO TO A17.
A17.	Disconnect WARNING ALARM CONTROLLER connector. Connect a digital multimeter from cavity 6 to chassis ground. Measure resistance.	Less than infinite.	Repair short to ground in BLK/BLU wire between WARNING ALARM CONTROLLER and LH DOOR SWITCH.
		Infinite.	Replace WARNING ALARM CONTROLLER.

AUDIBLE WARNINGS

SYSTEM DIAGNOSIS

AUDIBLE WARNINGS		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A18.	Disconnect JUNCTION BLOCK connector C2.	Alarm stops.	Replace IGNITION KEY WARNING SWITCH.
		Alarm continues to sound.	GO TO A19.
A19.	Disconnect JUNCTION BLOCK connector C5. Connect a test lamp from JUNCTION BLOCK terminal 8 to chassis ground.	Test lamp lights.	Replace JUNCTION BLOCK.
		Test lamp does not light.	GO TO A20.
A20.	Disconnect WARNING ALARM CONTROLLER connector. Connect a test lamp from connector cavity 4 to chassis ground.	Test lamp lights.	Repair short to voltage in BLU/BLK wire.
		Test lamp does not light.	Replace WARNING ALARM CONTROLLER.
A21.	Backprobe JUNCTION BLOCK connector C5 with a test lamp from cavity 16 to chassis ground.	Test lamp does not light.	Replace JUNCTION BLOCK.
		Test lamp lights.	GO TO A22.
A22.	Disconnect WARNING ALARM CONTROLLER connector. Connect a test lamp from connector cavity 5 to chassis ground.	Test lamp does not light.	Repair open in BLK/WHT wire between WARNING ALARM CONTROLLER and JUNCTION BLOCK.
		Test lamp lights.	GO TO A23.
A23.	Connect a digital multimeter from WARNING ALARM CONTROLLER connector cavity 1 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace WARNING ALARM CONTROLLER.
		More than 0.3 ohms.	GO TO A24.
A24.	Backprobe LH SAFETY BELT SWITCH connector with a digital multimeter from cavity 2 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in GRA/RED wire.
		More than 0.3 ohms.	GO TO A25.
A25.	Disconnect LH SAFETY BELT SWITCH connector. Connect a digital multimeter across switch terminals 1 and 2. Measure resistance with safety belt unbuckled.	More than 0.3 ohms.	Replace LH SAFETY BELT SWITCH.
		Less than 0.3 ohms.	GO TO A26.
A26.	Backprobe JUNCTION BLOCK connector C10 with a digital multimeter from terminal 1 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in BLK wire between LH SAFETY BELT SWITCH and JUNCTION BLOCK.
		More than 0.3 ohms.	Replace JUNCTION BLOCK.
A27.	Disconnect WARNING ALARM CONTROLLER connector. Connect a fused jumper from cavity 3 to chassis ground.	Safety Belt Warning Lamp lights.	Replace WARNING ALARM CONTROLLER.
		Safety Belt Warning Lamp does not light.	Disconnect jumper and GO TO A28.

AUDIBLE WARNINGS

SYSTEM DIAGNOSIS

AUDIBLE WARNINGS		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A28.	Disconnect INSTRUMENT PANEL CLUSTER connector C1. Connect a digital multimeter from INSTRUMENT PANEL CLUSTER connector terminal 8 to WARNING ALARM CONTROLLER connector cavity 3. Measure resistance.	More than 0.3 ohms.	Repair open in GRA/YEL wire.
		Less than 0.3 ohms.	GO TO A29 .
A29.	Connect a test lamp from INSTRUMENT PANEL CLUSTER connector C1 terminal 4 to chassis ground.	Test lamp lights.	Repair open in INSTRUMENT PANEL CLUSTER printed circuit.
		Test lamp does not light.	Repair open in BLK/WHT wire between S206 and INSTRUMENT PANEL CLUSTER.
A30.	Disconnect LH SAFETY BELT SWITCH connector.	Alarm stops.	Replace LH SAFETY BELT SWITCH.
		Alarm continues to sound.	GO TO A31 .
A31.	Disconnect WARNING ALARM CONTROLLER connector. Connect a digital multimeter from connector cavity 1 to chassis ground. Measure resistance.	Less than infinite.	Repair short to ground in GRA/RED wire.
		Infinite.	Replace WARNING ALARM CONTROLLER.
A32.	Disconnect WARNING ALARM CONTROLLER connector.	Safety Belt Warning Lamp goes out.	Replace WARNING ALARM CONTROLLER.
		Safety Belt Warning Lamp remains lit.	GO TO A33 .
A33.	Disconnect INSTRUMENT PANEL CLUSTER connector C1. Connect a digital multimeter from terminal 8 to chassis ground. Measure resistance.	Less than infinite.	Repair short to ground in GRA/YEL wire.
		Infinite.	Repair short to ground in INSTRUMENT PANEL printed circuit.
A34.	Disconnect WARNING ALARM CONTROLLER connector. Connect a test lamp from cavity 2 to chassis ground.	Test lamp lights.	Replace WARNING ALARM CONTROLLER.
		Test lamp does not light	GO TO A35 .
A35.	Backprobe LIGHT SWITCH connector with a test lamp from cavity 11 to chassis ground.	Test lamp lights.	Repair open in RED/YEL wire between WARNING ALARM CONTROLLER and LIGHT SWITCH.
		Test lamp does not light.	GO TO A36 .

AUDIBLE WARNINGS

SYSTEM DIAGNOSIS

AUDIBLE WARNINGS		DIAGNOSTIC CHART A (CONT'D)	
	TEST	RESULT	ACTION
A36.	Backprobe LIGHT SWITCH connector with a test lamp from cavity 4 to chassis ground.	Test lamp lights.	Replace LIGHT SWITCH.
		Test lamp does not light.	Repair open in WHT wire between LIGHT SWITCH and JUNCTION BLOCK.
A37.	Disconnect LIGHT SWITCH connector. Connect a test lamp from connector cavity 11 to chassis ground.	Test lamp lights.	Repair short to voltage in RED/YEL wire between LIGHT SWITCH and WARNING ALARM CONTROLLER.
		Test lamp does not light.	Replace LIGHT SWITCH.

CIRCUIT OPERATION

IGNITION KEY WARNING ALARM

Battery voltage is applied through the Tail Fuse at all times to the IGNITION KEY WARNING SWITCH. When the ignition key is inserted into the ignition cylinder, the IGNITION KEY WARNING SWITCH is closed, and a voltage signal is provided to the WARNING ALARM CONTROLLER. If the LH door is opened, the LH DOOR SWITCH closes and provides a ground signal to the WARNING ALARM CONTROLLER. When these two signals are received simultaneously, the WARNING ALARM CONTROLLER activates the high-frequency ignition key warning alarm.

SAFETY BELT WARNING ALARM

The WARNING ALARM CONTROLLER receives an ignition ON signal (in the form

of battery voltage) through the Ignition Fuse whenever the ignition switch is in the "ON" or "START" position. If the driver's safety belt is not buckled, a ground signal is provided to the WARNING ALARM CONTROLLER through the SAFETY BELT SWITCH from G203. When the WARNING ALARM MODULE receives an ignition ON signal and a ground signal through the LH SAFETY BELT SWITCH simultaneously, the WARNING ALARM CONTROLLER activates the constant safety belt warning alarm.

HEADLIGHT WARNING ALARM

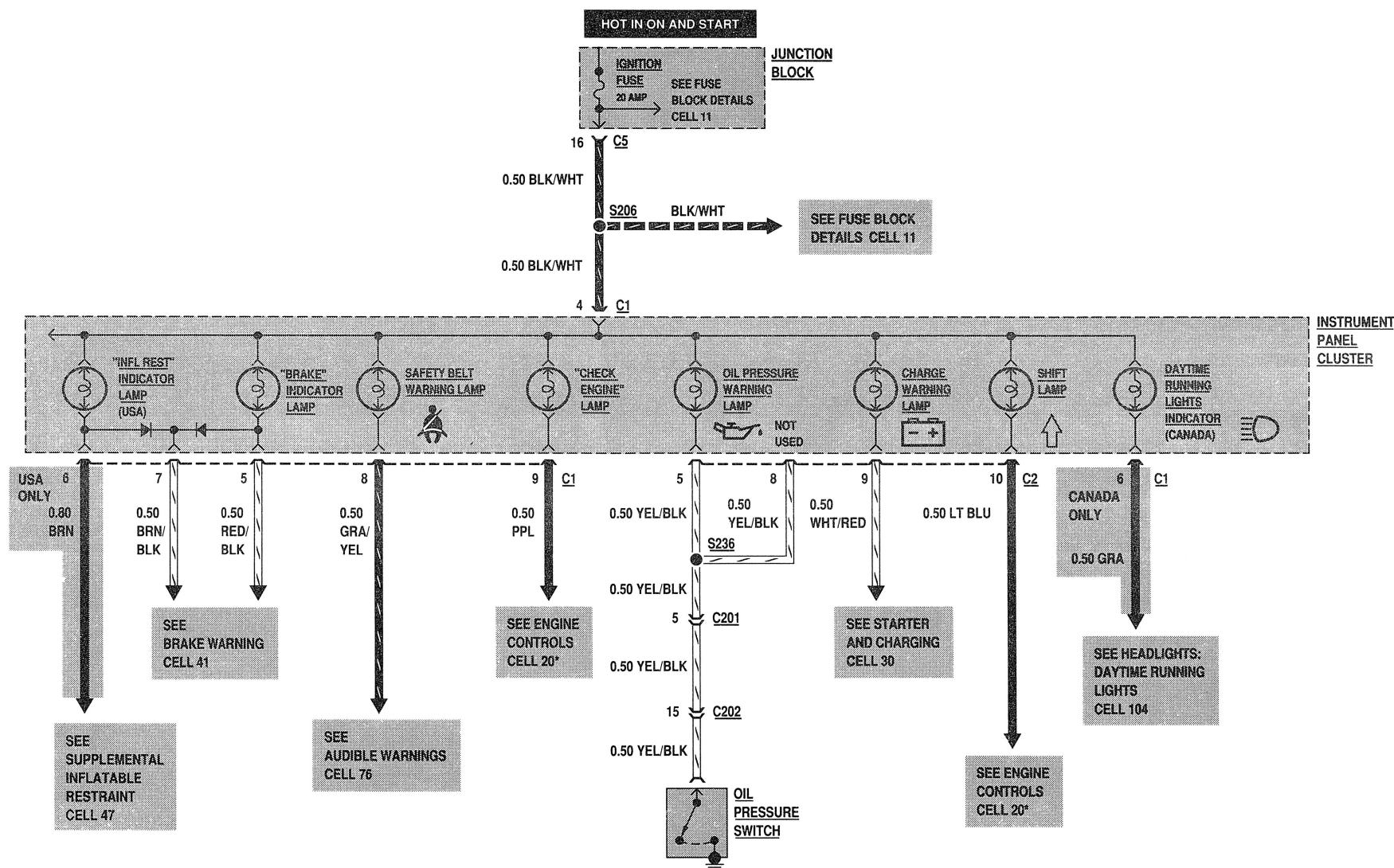
The headlight warning alarm will sound if the LIGHT SWITCH is in the "PARK" or "HEAD" position, the LH door is open and the ignition key has been removed. Voltage

is applied at all times through the Tail Fuse to the LIGHT SWITCH. When the LIGHT SWITCH is in the "PARK" or "HEAD" position, the switch closes and sends a lights ON signal to the WARNING ALARM CONTROLLER. With the LH door open, a ground signal is provided through the LH DOOR SWITCH to the WARNING ALARM CONTROLLER. When both of these conditions are met simultaneously, the WARNING ALARM CONTROLLER activates the low-frequency warning alarm.

If the LH door is open, the LIGHT SWITCH is in the "PARK" or "HEAD" position, and the ignition key has been removed from the ignition switch, the high-frequency ignition key warning alarm will override the low-frequency headlight warning alarm.

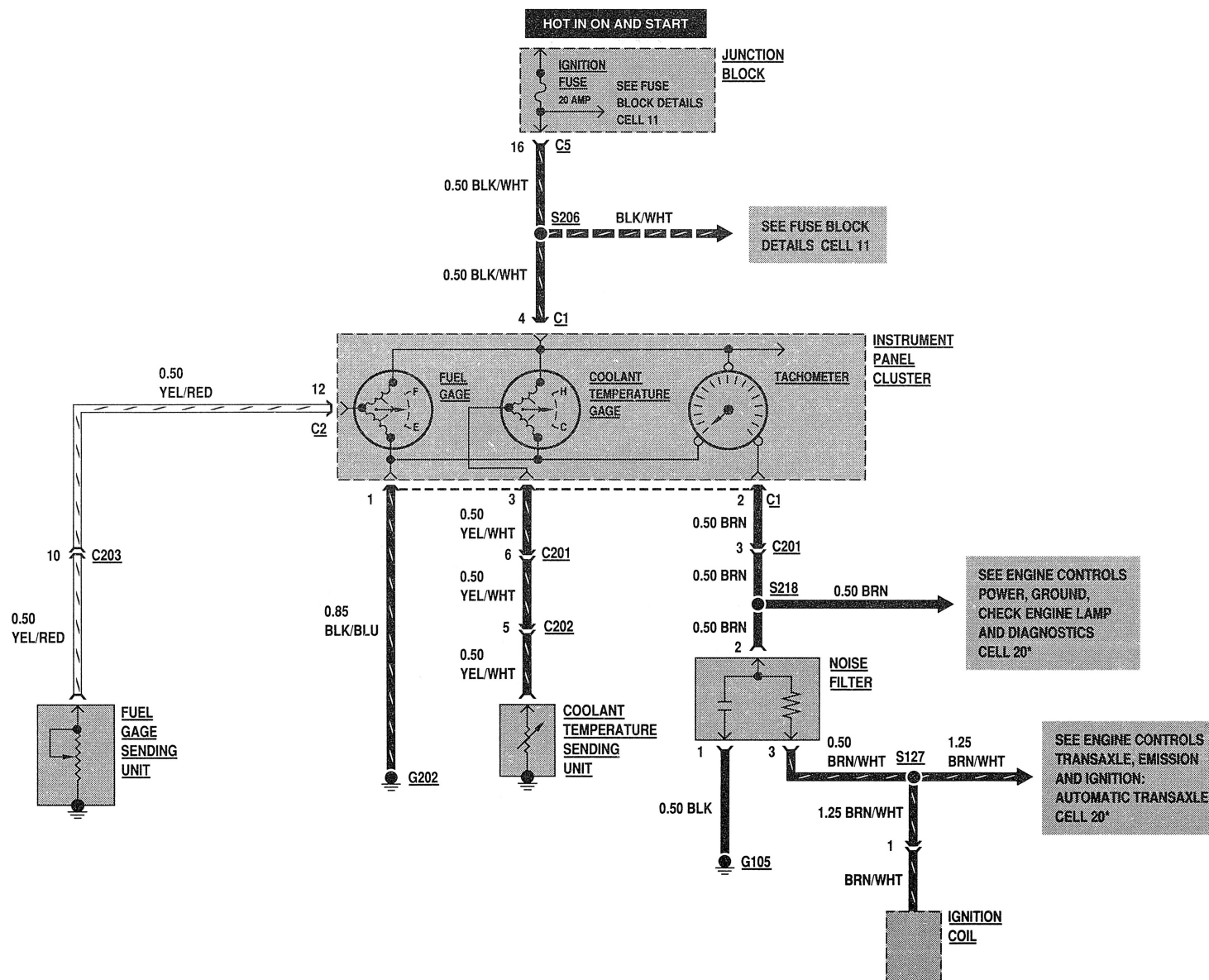
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INSTRUMENT PANEL: WITH GAGES CLUSTER



*Refer to 1990 Geo METRO ELECTRICAL DIAGNOSIS SERVICE MANUAL SUPPLEMENT (ST370-90EDM)

INSTRUMENT PANEL: WITH GAGES CLUSTER



*Refer to 1990 Geo METRO ELECTRICAL DIAGNOSIS SERVICE MANUAL SUPPLEMENT (ST370-90EDM)

INSTRUMENT PANEL: WITH GAGES CLUSTER

COMPONENT	LOCATION	FIGURE	CONNECTOR
Coolant Temperature Sending Unit	In Intake Manifold	201-00/A	
Fuel Gage Sending Unit	In Fuel Tank	201-06/A	
Ignition Coil	LH Bulkhead		
Instrument Panel Cluster	LH Dash	201-04/A	
C1 (10 Terminals)	I/P Harness to I/P Cluster, behind upper RH corner of I/P Cluster	201-04/B	81-08
C2 (12 Terminals)	I/P Harness to I/P Cluster, behind upper LH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH side of I/P	201-05/A	
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
C6 (3 Cavities)	I/P Harness to Junction Block, behind LH I/P		
C9 (6 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/A1
Noise Filter	LH Bulkhead behind Ignition Coil		
Oil Pressure Switch	Front of Engine behind RH A/C Condenser Fan	201-00/A	
C201 (18 Cavities) (USA)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/A3
C202 (15 Cavities)	Main Harness to Engine Harness, behind I/P near Junction Block	201-05/A	202-01/B1
C203 (12 Cavities)	I/P Harness to Floor Harness, near Junction Block	201-06/A	202-00/B2
S102	Main Harness, in Engine Compartment, near LH Grommet		
S127	Main Harness, near LH Grommet	201-01/A	
S201	I/P Harness, behind LH I/P	201-04/B	
S206	I/P Harness, behind I/P above Warning Alarm Controller	201-04/B	
S218	Main Harness, near I/P Harness Branch	201-05/A	
S226	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S227	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S229	I/P Harness, behind LH I/P near Junction Block	201-04/B	
G105	Center of Bulkhead	201-04/A	
G200	LH I/P above Kick Panel	201-05/A	
G202	Left of Cigar Lighter on I/P Support	201-04/B	
G203	Junction Block Case Ground, under LH I/P	201-08/B	

INSTRUMENT PANEL: WITH GAGES CLUSTER

TROUBLESHOOTING HINTS

1. Check Ignition Fuse by starting vehicle.
2. Check that ground G202 is clean and tight.
3. Check that engine coolant level is adequate for Coolant Temperature Gage operation.
4. If the Tachometer, the Fuel Gage and the Oil Pressure Warning Lamp are all inoperative:
 - Check for an open in the BLK/WHT wire between the JUNCTION BLOCK and the INSTRUMENT PANEL CLUSTER.
 - Check for an open in the BLK/BLU ground wire between the INSTRUMENT PANEL CLUSTER and G202.
 - Check the INSTRUMENT PANEL CLUSTER printed circuit for cracks and bad connections.

SYSTEM DIAGNOSIS

INSTRUMENT PANEL: WITH GAGES CLUSTER		DIAGNOSTIC CHART A	
TEST		RESULT	ACTION
A1.	Turn ignition switch to "ON." Check Fuel Gage operation.	Fuel Gage indicates correct fuel level.	GO TO A2.
		Fuel Gage indicates "F" when fuel tank is empty.	GO TO A6.
		Fuel Gage indicates "E" when fuel tank is full.	GO TO A8.
A2.	Observe Oil Pressure Warning Lamp operation.	Oil Pressure Warning Lamp lights.	GO TO A3.
		Oil Pressure Warning Lamp does not light.	GO TO A10.
A3.	Start engine.	Oil Pressure Warning Lamp goes out.	GO TO A4.
		Oil Pressure Warning Lamp remains lit.	GO TO A12.
A4.	With engine running, observe Tachometer operation.	Tachometer indicates correct engine rpm.	GO TO A5.
		Tachometer does not indicate correct engine rpm.	GO TO A15.
A5.	Run engine until operating temperature has been attained. Check Coolant Temperature Gage.	Coolant Temperature Gage indicates correct engine coolant temperature.	All systems diagnosed in this cell are functioning normally.
		Coolant Temperature Gage indicates "C" when engine coolant temperature is hot.	GO TO A18.
		Coolant Temperature Gage indicates "H" when engine coolant temperature is cold.	GO TO A20.

INSTRUMENT PANEL: WITH GAGES CLUSTER

SYSTEM DIAGNOSIS

INSTRUMENT PANEL: WITH GAGES CLUSTER DIAGNOSTIC CHART A (CONT'D)			
TEST		RESULT	ACTION
A6.	Disconnect FUEL GAGE SENDING UNIT connector.	Fuel Gage indicates "E."	Replace FUEL GAGE SENDING UNIT.
		Fuel Gage still indicates "F."	GO TO A7.
A7.	Disconnect INSTRUMENT PANEL CLUSTER connector C2.	Fuel Gage indicates "E."	Repair short to ground in YEL/RED wire.
		Fuel Gage still indicates "F."	Check INSTRUMENT PANEL CLUSTER printed circuit for cracks and bad connections. If good, replace Fuel Gage.
A8.	Disconnect FUEL GAGE SENDING UNIT connector. Connect a fused jumper from connector cavity to chassis ground.	Fuel Gage indicates "F."	Replace FUEL GAGE SENDING UNIT.
		Fuel Gage still indicates "E."	GO TO A9.
A9.	Disconnect INSTRUMENT PANEL CLUSTER connector C2. Connect a digital multimeter from FUEL GAGE SENDING UNIT connector cavity to terminal 12 of INSTRUMENT PANEL CLUSTER connector C2. Measure resistance.	More than 0.3 ohms.	Repair open in YEL/RED wire.
		Less than 0.3 ohms.	Check INSTRUMENT PANEL CLUSTER printed circuit for cracks and bad connections. If good, replace Fuel Gage.
A10.	Disconnect OIL PRESSURE SWITCH. Connect a fused jumper from connector cavity to chassis ground.	Oil Pressure Warning Lamp lights.	Replace OIL PRESSURE SWITCH.
		Oil Pressure Warning Lamp does not light.	GO TO A11.
A11.	Disconnect INSTRUMENT PANEL CLUSTER connector C2. Connect a digital multimeter from OIL PRESSURE SWITCH connector cavity to terminal 5 of INSTRUMENT PANEL CLUSTER connector C2. Measure resistance.	More than 0.3 ohms.	Repair open in YEL/BLK wire.
		Less than 0.3 ohms.	Repair open in INSTRUMENT PANEL CLUSTER printed circuit.
A12.	Disconnect OIL PRESSURE SWITCH connector.	Oil Pressure Warning Lamp remains lit.	GO TO A13.
		Oil Pressure Warning Lamp goes out.	GO TO A14.
A13.	Disconnect INSTRUMENT PANEL CLUSTER connector C2. Connect a digital multimeter from connector terminal 5 to chassis ground. Measure resistance.	Infinite.	Repair short to ground in INSTRUMENT PANEL CLUSTER printed circuit.
		Less than infinite.	Repair short to ground in YEL/BLK wire.

INSTRUMENT PANEL: WITH GAGES CLUSTER

SYSTEM DIAGNOSIS

INSTRUMENT PANEL: WITH GAGES CLUSTER DIAGNOSTIC CHART A (CONT'D)		
TEST	RESULT	ACTION
A14. Shut engine off. Remove OIL PRESSURE SWITCH and connect a mechanical gage. Start engine and note oil pressure.	Oil pressure is at least 31 kPa (4.5 psi).	Replace OIL PRESSURE SWITCH.
	Oil pressure is less than 31 kPa (4.5 psi).	Refer to ENGINE (SEC.6) of the 1990 Geo Metro Service Manual.
A15. Disconnect NOISE FILTER connector. Connect a fused jumper from connector cavity 2 to cavity 3.	Tachometer indicates correct engine rpm.	Replace NOISE FILTER.
	Tachometer does not indicate correct engine rpm.	Disconnect jumper, turn ignition switch to "OFF" and GO TO A16.
A16. Disconnect IGNITION COIL connector. Connect a digital multimeter from IGNITION COIL connector cavity 1 to NOISE FILTER connector cavity 3. Measure resistance.	More than 0.3 ohms.	Repair open in BRN/WHT wire between NOISE FILTER and S127.
	Less than 0.3 ohms.	GO TO A17.
A17. Disconnect INSTRUMENT PANEL CLUSTER connector C1. Connect a digital multimeter from INSTRUMENT PANEL CLUSTER connector C1 terminal 2 to NOISE FILTER connector cavity 2. Measure resistance.	More than 0.3 ohms.	Repair open in BRN wire between INSTRUMENT PANEL CLUSTER and NOISE FILTER.
	Less than 0.3 ohms.	Check INSTRUMENT PANEL printed circuit for cracks and bad connections. If good, replace Tachometer.
A18. Disconnect COOLANT TEMPERATURE SENDING UNIT connector. Connect a fused jumper from connector cavity to chassis ground.	Coolant Temperature Gage indicates "H."	Replace COOLANT TEMPERATURE SENDING UNIT.
	Coolant Temperature Gage indicates "C."	GO TO A19.
A19. Disconnect INSTRUMENT PANEL CLUSTER connector C1. Connect a digital multimeter from terminal 3 of INSTRUMENT PANEL CLUSTER connector C1 to COOLANT TEMPERATURE SENDING UNIT connector cavity. Measure resistance.	More than 0.3 ohms.	Repair open in YEL/WHT wire.
	Less than 0.3 ohms.	Check INSTRUMENT PANEL printed circuit for cracks and bad connections. If good, replace Coolant Temperature Gage.

INSTRUMENT PANEL: WITH GAGES CLUSTER

SYSTEM DIAGNOSIS

INSTRUMENT PANEL: WITH GAGES CLUSTER DIAGNOSTIC CHART A (CONT'D)		
TEST	RESULT	ACTION
A20. Disconnect COOLANT TEMPERATURE SENDING UNIT connector.	Coolant Temperature Gage indicates "C."	Replace COOLANT TEMPERATURE SENDING UNIT.
	Coolant Temperature Gage indicates "H."	GO TO A21 .
A21. Disconnect INSTRUMENT PANEL CLUSTER connector C1. Connect a digital multimeter from connector terminal 3 to chassis ground. Measure resistance.	Less than infinite.	Repair short to ground in YEL/WHT wire.
	Infinite.	Check INSTRUMENT PANEL printed circuit for cracks and bad connections. If good, replace Coolant Temperature Gage.

CIRCUIT OPERATION

FUEL GAGE

The pointer of the FUEL GAGE is moved by the magnetic fields of two coils. The coils are at right angles to each other. Voltage is applied to coil F from the Ignition Fuse. The circuit divides at the opposite (ground) side of the coil. One path seeks a ground through coil E to G202 and the other path seeks a ground through the variable resistor in the FUEL SENDING UNIT.

When fuel level is low, resistance in the FUEL GAGE SENDING UNIT is high. Since voltage will always seek the path of least resistance, voltage will flow through coil F and coil E to ground at G202. Because the length of the E coil winding is twice the length of the F coil winding, the magnetic field generated by the E coil is twice as strong as the magnetic field generated by

the F coil. Therefore, the pointer will be pulled to the "E" position.

As fuel level increases, resistance in the FUEL GAGE SENDING UNIT decreases. Since voltage will always seek the path of least resistance, more voltage will begin to bypass the E coil and travel directly to ground through the FUEL GAGE SENDING UNIT. Under these conditions, the coil F magnetic field becomes stronger than the coil E magnetic field and the pointer moves toward the "F" position.

COOLANT TEMPERATURE GAGE

The pointer of the COOLANT TEMPERATURE GAGE is moved by the magnetic fields of two coils. The coils are at right angles to each other. Voltage is applied to coil H from the Ignition Fuse. The circuit divides at the opposite (ground) side of the coil. One path seeks a ground through coil C

and the other path seeks a ground through the variable resistor in the COOLANT TEMPERATURE SENDING UNIT.

When coolant temperature is low, resistance in the COOLANT TEMPERATURE SENDING UNIT is high. Since voltage will always seek the path of least resistance, voltage will flow through the H coil and the C coil to ground at G202. Because the length of the C coil winding is twice the length of the coil H winding, the magnetic field generated by coil C is twice as strong as the magnetic field generated by coil H. Therefore, the pointer will be pulled to the "C" position.

As coolant temperature increases, resistance in the COOLANT TEMPERATURE SENDING UNIT decreases. Since voltage will always seek the path of least resistance, more voltage will begin to bypass the C coil

INSTRUMENT PANEL: WITH GAGES CLUSTER

and travel directly to ground through the COOLANT TEMPERATURE SENDING UNIT. Under these conditions, the coil H magnetic field becomes stronger than the coil C magnetic field and the pointer moves toward the "H" position.

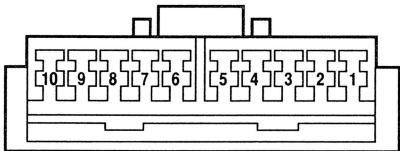
OIL PRESSURE WARNING LAMP

With the ignition switch in the "ON" or "START" position, battery voltage is applied through the Ignition Fuse to the Oil Pressure Warning Lamp in the INSTRUMENT PANEL CLUSTER. If engine

oil pressure should fall below 31 kPa (4.5 psi), the OIL PRESSURE SWITCH located in the cylinder block closes. With this switch closed, a ground path is provided to the Oil Pressure Warning Lamp and the bulb lights.

INSTRUMENT PANEL: WITH GAGES CLUSTER

INSTRUMENT PANEL CLUSTER CONNECTOR: C1

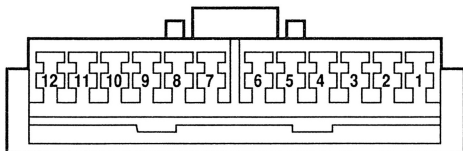


(TERMINAL SIDE)

WIRING DETAIL LEGEND

CAVITY	WIRE COLOR	CIRCUIT
1	BLK/BLU	Ground – G202
2	BRN	Ignition Coil – Tachometer Lead
3	YEL/WHT	Coolant Temperature Sending Unit
4	BLK/WHT	Ignition Fuse
5	RED/BLK	Parking Brake Switch and Brake Fluid Level Switch
6	BRN	Diagnostic Energy Reserve Module (DERM)
	GRN	Daytime Running Lamps Controller
7	BRN/BLK	Ignition Switch
8	GRA/YEL	Warning Alarm Controller
9	PPL	Engine Control Module “Check Engine” Lamp
10	GRN/YEL	Light Switch

INSTRUMENT PANEL CLUSTER CONNECTOR: C2



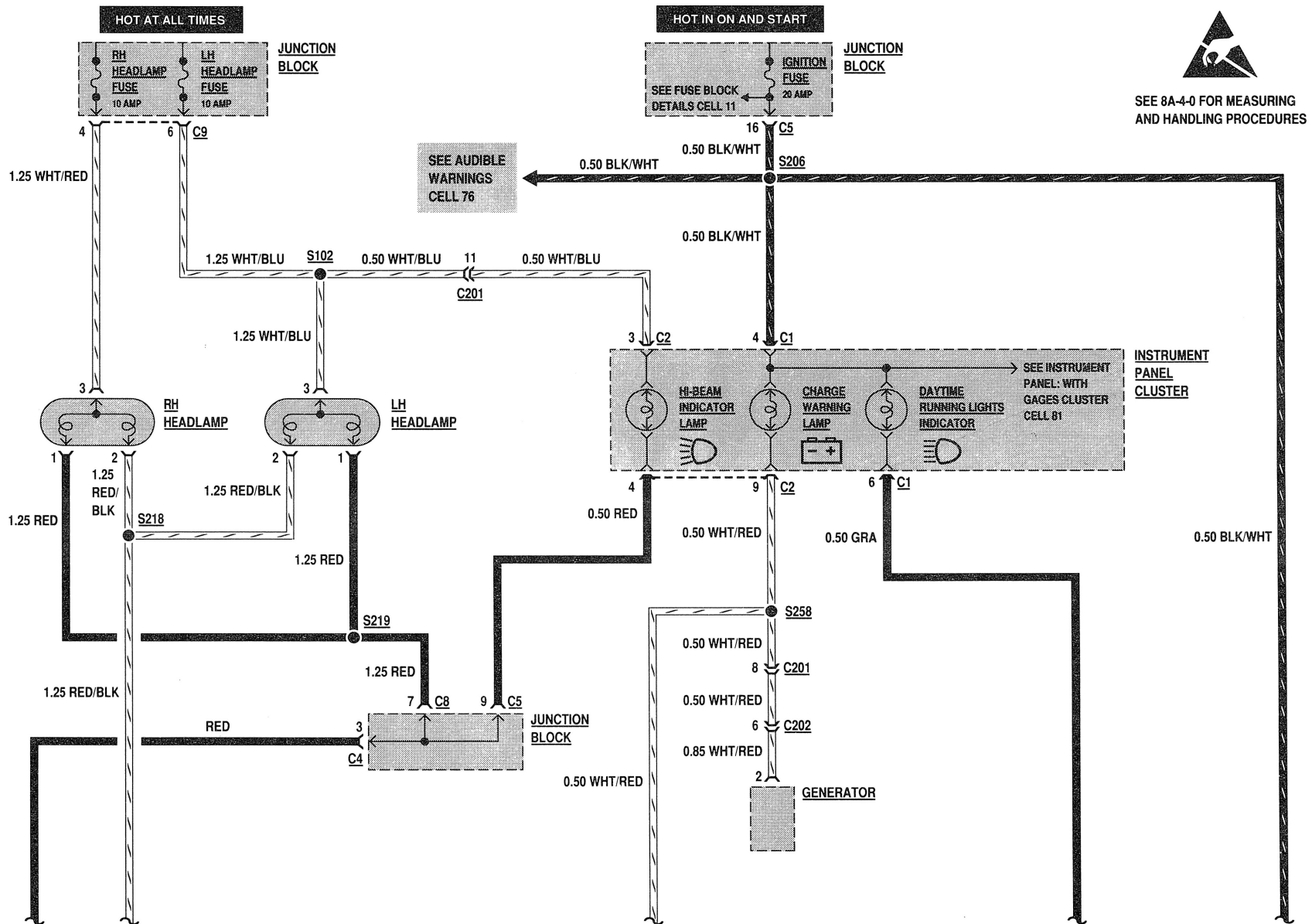
(TERMINAL SIDE)

WIRING DETAIL LEGEND

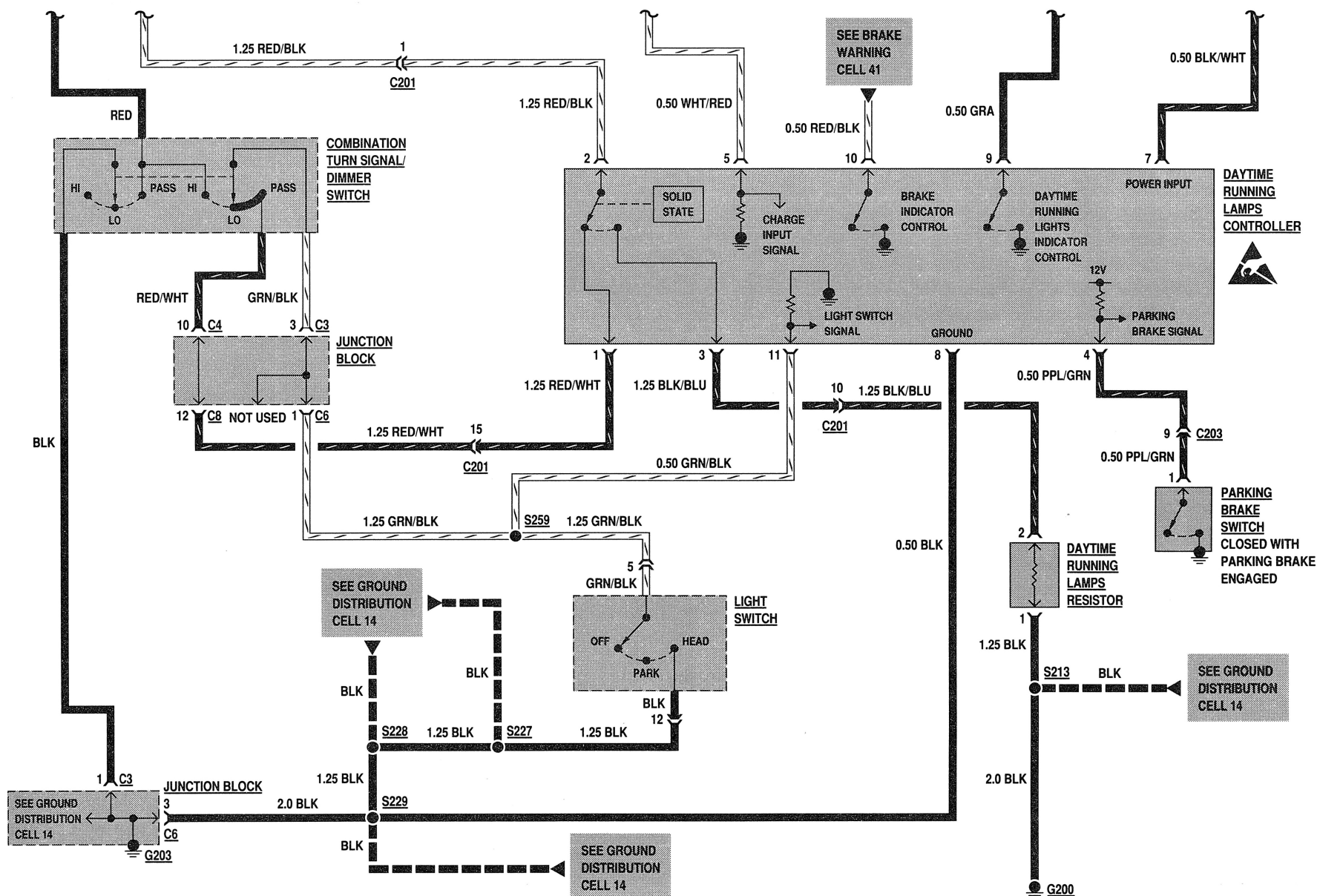
CAVITY	WIRE COLOR	CIRCUIT
1	BLK	Ground – G203
2	GRN/RED	Light Switch
3	WHT/BLU	LH Headlamp Fuse
4	RED	Combination Switch
5	YEL/BLK	Oil Pressure Switch
6	RED/GRN	Illumination Controller
7	RED/YEL	Light Switch
8	YEL/BLK	Not Used
9	WHT/RED	Generator
10	LT BLU	Engine Control Module – Shift Lamp (Manual Transaxle Only)
11	YEL/GRN	Engine Control Module – VSS Input
12	YEL/RED	Fuel Gage Sending Unit

BLANK

HEADLIGHTS: DAYTIME RUNNING LIGHTS



SEE 8A-4-0 FOR MEASURING AND HANDLING PROCEDURES



HEADLIGHTS: DAYTIME RUNNING LIGHTS

COMPONENT	LOCATION	FIGURE	CONNECTOR
Combination Turn Signal/Dimmer Switch	LH side of Steering Column		202-02/B3
Daytime Running Lamps Controller	LH side of I/P Cluster	201-04/B	202-02/C2
Daytime Running Lamps Resistor	Inside LH Front Fender		
Generator	RH rear of Engine	201-00/A	
Instrument Panel Cluster	LH Dash	201-04/B	
C1 (10 Terminals)	I/P Harness to I/P Cluster, behind upper RH corner of I/P Cluster	201-04/B	81-08
C2 (12 Terminals)	I/P Harness to I/P Cluster, behind upper LH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH I/P	201-07/B	
C3 (6 Cavities)	Combination Switch to Junction Block, behind LH I/P		202-00/A2
C4 (10 Cavities)	Combination Switch to Junction Block, behind LH I/P		202-02/B3
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
C6 (3 Cavities)	I/P Harness to Junction Block, behind LH I/P		
C8 (14 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/B1
C9 (6 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/A1
Light Switch	LH side of Cluster Switch Panel	201-04/B	202-00/B2
Parking Brake Switch	Passenger Compartment behind Gear Selector	201-06/A	
C201 (20 Cavities) (Canada)	Main Harness to I/P Harness, behind I/P near Junction Block	201-05/A	202-02/C3
C202 (15 Cavities)	Main Harness to Engine Harness, behind I/P near Junction Block	201-05/A	202-01/B1
C203 (12 Cavities)	I/P Harness to Floor Harness, near Junction Block	201-06/A	202-00/B2
S102	Main Harness, in Engine Compartment near LH Grommet		
S206	I/P Harness, behind I/P above Warning Alarm Controller	201-04/B	
S213	Main Harness, near Junction Block	201-05/A	
S218	Main Harness, near I/P Harness Branch	201-05/A	
S219	Main Harness, near I/P Harness Branch	201-05/A	
S227	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S228	I/P Harness, behind LH I/P	201-04/B	
S229	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S258 (Canada Only)	I/P Harness, above Junction Block	201-04/B	
S259 (Canada Only)	I/P Harness, below LH I/P	201-04/B	
G200	LH I/P above Kick Panel	201-05/A	
G203	Junction Block Case Ground, under LH I/P	201-08/A	

HEADLIGHTS: DAYTIME RUNNING LIGHTS**TROUBLESHOOTING HINTS**

1. Check the LH and RH Headlamp Fuses by pressing LIGHT SWITCH to "HEAD" and noting HEADLAMP operation.
2. Check the Ignition Fuse by attempting to start engine.
3. Check that grounds G200 and G203 are clean and tight.

SYSTEM DIAGNOSIS

HEADLIGHTS: DAYTIME RUNNING LIGHTS		DIAGNOSTIC CHART A	
TEST		RESULT	ACTION
A1.	Press the LIGHT SWITCH to "HEAD" and COMBINATION TURN SIGNAL/DIMMER SWITCH to "LO."	Low-beam HEADLAMPS operate.	GO TO A2.
		Low-beam HEADLAMPS do not operate.	GO TO A7.
A2.	Push the COMBINATION TURN SIGNAL/DIMMER SWITCH to "HI."	High-beam HEADLAMPS operate.	GO TO A3.
		High-beam HEADLAMPS do not operate.	GO TO A16.
A3.	Pull the COMBINATION TURN SIGNAL/DIMMER SWITCH back to "PASS."	Low and high-beam HEADLAMPS operate while switch is held.	GO TO A4.
		High-beam HEADLAMPS do not operate while switch is held.	GO TO A18.
A4.	Press LIGHT SWITCH to "OFF" or "PARK" position. Start engine.	Daytime Running Lights operate and Daytime Running Lamps Indicator lights.	GO TO A5.
		Daytime Running Lights do not operate.	GO TO A19.
		Daytime Running Lights operate, but Indicator does not light.	GO TO A30.
A5.	Apply parking brake.	Daytime Running Lights operation stops and Indicator goes out.	GO TO A6.
		Daytime Running Lights continue to operate.	GO TO A33.

HEADLIGHTS: DAYTIME RUNNING LIGHTS

SYSTEM DIAGNOSIS

HEADLIGHTS: DAYTIME RUNNING LIGHTS		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A6.	Shut engine off and disengage parking brake. Turn ignition switch to "ON."	Daytime Running Lights do not operate.	All systems diagnosed in this cell are functioning normally.
		Daytime Running Lights continue to operate.	GO TO A35.
A7.	Disconnect DAYTIME RUNNING LAMPS CONTROLLER connector. Connect a fused jumper from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 2 to chassis ground.	Low-beam HEADLAMPS do not operate.	Repair open in RED/BLK wire between DAYTIME RUNNING LAMPS CONTROLLER and HEADLAMPS or in WHT/RED or WHT/BLU wire between JUNCTION BLOCK and HEADLAMPS.
		Low-beam HEADLAMPS operate.	GO TO A8.
A8.	Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 1 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace DAYTIME RUNNING LAMPS CONTROLLER.
		More than 0.3 ohms.	GO TO A9.
A9.	Backprobe JUNCTION BLOCK connector C8 with a digital multimeter from cavity 12 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in RED/WHT wire between DAYTIME RUNNING LAMPS CONTROLLER and JUNCTION BLOCK.
		More than 0.3 ohms.	GO TO A10.
A10.	Backprobe JUNCTION BLOCK connector C4 with a digital multimeter from cavity 10 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace JUNCTION BLOCK.
		More than 0.3 ohms.	GO TO A11.
A11.	Backprobe JUNCTION BLOCK connector C3 with a digital multimeter from cavity 3 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace COMBINATION TURN SIGNAL/DIMMER SWITCH.
		More than 0.3 ohms.	GO TO A12.
A12.	Backprobe JUNCTION BLOCK connector C6 with a digital multimeter from cavity 1 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace JUNCTION BLOCK.
		More than 0.3 ohms.	GO TO A13.
A13.	Backprobe LIGHT SWITCH connector with a digital multimeter from cavity 5 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in GRN/BLK wire between JUNCTION BLOCK and LIGHT SWITCH.
		More than 0.3 ohms.	GO TO A14.

HEADLIGHTS: DAYTIME RUNNING LIGHTS

SYSTEM DIAGNOSIS

HEADLIGHTS: DAYTIME RUNNING LIGHTS		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A14.	Backprobe LIGHT SWITCH connector with a digital multimeter from cavity 12 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace LIGHT SWITCH.
		More than 0.3 ohms.	GO TO A15.
A15.	Backprobe JUNCTION BLOCK connector C6 with a digital multimeter from cavity 3 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in BLK wire between JUNCTION BLOCK and LIGHT SWITCH.
		More than 0.3 ohms.	Replace JUNCTION BLOCK.
A16.	Disconnect JUNCTION BLOCK connector C8. Connect a digital multimeter from JUNCTION BLOCK terminal 7 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in RED wire between JUNCTION BLOCK and HEADLAMPS.
		More than 0.3 ohms.	GO TO A17.
A17.	Backprobe JUNCTION BLOCK connector C4 with a digital multimeter from cavity 3 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace JUNCTION BLOCK.
		More than 0.3 ohms.	Replace COMBINATION TURN SIGNAL/DIMMER SWITCH.
A18.	Backprobe JUNCTION BLOCK connector C3 with a digital multimeter from cavity 1 to chassis ground. Measure resistance.	More than 0.3 ohms.	Replace JUNCTION BLOCK.
		Less than 0.3 ohms.	Replace COMBINATION TURN SIGNAL/DIMMER SWITCH.
A19.	Turn ignition switch to "OFF." Disconnect DAYTIME RUNNING LAMPS CONTROLLER connector. Connect a digital multimeter from connector cavity 8 to chassis ground. Measure resistance.	More than 0.3 ohms.	Repair BLK ground wire between DAYTIME RUNNING LAMPS CONTROLLER and S229.
		Less than 0.3 ohms.	GO TO A20.
A20.	Turn ignition switch to "ON." Connect a test lamp from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 7 to chassis ground.	Test lamp does not light.	GO TO A21.
		Test lamp lights.	GO TO A22.
A21.	Backprobe JUNCTION BLOCK connector C5 with a test lamp from cavity 16 to chassis ground.	Test lamp lights.	Repair open in BLK/WHT wire between JUNCTION BLOCK and DAYTIME RUNNING LAMPS CONTROLLER.
		Test lamp does not light.	Replace JUNCTION BLOCK.
A22.	Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 11 to chassis ground. Measure voltage.	Less than 10.0 volts.	Repair open in GRN/BLK wire between DAYTIME RUNNING LAMPS CONTROLLER and S259.
		More than 10.0 volts.	GO TO A23.

HEADLIGHTS: DAYTIME RUNNING LIGHTS

SYSTEM DIAGNOSIS

HEADLIGHTS: DAYTIME RUNNING LIGHTS		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A23.	Start engine. Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 5 to chassis ground. Measure voltage.	Less than 10.0 volts.	GO TO A24.
		More than 10.0 volts.	GO TO A25.
A24.	Backprobe GENERATOR connector with a digital multimeter from cavity 2 to chassis ground. Measure voltage.	More than 10.0 volts.	Repair open in WHT/RED wire between GENERATOR and DAYTIME RUNNING LAMPS CONTROLLER.
		Less than 10.0 volts.	A fault exists in the GENERATOR Charge Warning circuit. Refer to Diagnostic Chart B in Cell 30 for Charging System Diagnosis.
A25.	Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 3 to chassis ground. Measure resistance.	Infinite.	GO TO A27.
		Less than infinite.	GO TO A26.
A26.	Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 4 to chassis ground. Measure resistance with parking brake fully released.	Infinite.	Replace DAYTIME RUNNING LAMPS CONTROLLER.
		Less than infinite.	GO TO A29.
A27.	Disconnect DAYTIME RUNNING LAMPS RESISTOR connector. Connect a digital multimeter from DAYTIME RUNNING LAMPS CONTROLLER connector cavity 3 to DAYTIME RUNNING LAMPS RESISTOR connector cavity 2. Measure resistance.	More than 0.3 ohms.	Repair open in BLK/BLU wire.
		Less than 0.3 ohms.	GO TO A28.
A28.	Connect a digital multimeter from DAYTIME RUNNING LAMPS RESISTOR connector cavity 1 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace DAYTIME RUNNING LAMPS RESISTOR.
		More than 0.3 ohms.	Repair BLK ground wire between DAYTIME RUNNING LAMPS RESISTOR and G200.
A29.	Disconnect PARKING BRAKE SWITCH connector. Connect a digital multimeter from PARKING BRAKE SWITCH connector cavity to chassis ground. Measure resistance.	Infinite.	Replace PARKING BRAKE SWITCH.
		Less than infinite.	Repair short to ground in PPL/GRN wire.
A30.	Turn ignition switch to "OFF." Disconnect DAYTIME RUNNING LAMPS CONTROLLER connector. Connect a fused jumper from connector cavity 9 to chassis ground. Turn ignition switch to "ON."	Daytime Running Lamps Indicator lights.	Replace DAYTIME RUNNING LAMPS CONTROLLER.
		Daytime Running Lamps Indicator does not light.	GO TO A31.

HEADLIGHTS: DAYTIME RUNNING LIGHTS

SYSTEM DIAGNOSIS

HEADLIGHTS: DAYTIME RUNNING LIGHTS		DIAGNOSTIC CHART A (CONT'D)	
TEST		RESULT	ACTION
A31.	Disconnect INSTRUMENT PANEL CLUSTER connector C1. Connect a digital multimeter from INSTRUMENT PANEL CLUSTER connector C1 terminal 6 to DAYTIME RUNNING LAMPS CONTROLLER connector cavity 9. Measure resistance.	More than 0.3 ohms.	Repair open in GRA wire.
		Less than 0.3 ohms.	GO TO A32.
A32.	Connect a test lamp from INSTRUMENT PANEL CLUSTER connector C1 cavity 4 to chassis ground.	Test lamp lights.	Repair open in INSTRUMENT PANEL CLUSTER printed circuit.
		Test lamp does not light.	Repair open in BLK/WHT wire between JUNCTION BLOCK and INSTRUMENT PANEL CLUSTER.
A33.	Disconnect DAYTIME RUNNING LAMPS CONTROLLER connector. Connect a digital multimeter from connector cavity 4 to chassis ground. Measure resistance.	Less than 0.3 ohms.	Replace DAYTIME RUNNING LAMPS CONTROLLER.
		More than 0.3 ohms.	GO TO A34.
A34.	Backprobe PARKING BRAKE SWITCH with a digital multimeter from connector to chassis ground. Measure resistance.	Less than 0.3 ohms.	Repair open in PPL/GRN wire.
		More than 0.3 ohms.	Replace PARKING BRAKE SWITCH.
A35.	Disconnect DAYTIME RUNNING LAMPS CONTROLLER connector. Connect a digital multimeter from connector cavity 5 to chassis ground. Measure voltage.	Less than 1.0 volt.	Replace DAYTIME RUNNING LAMPS CONTROLLER.
		More than 1.0 volt.	A fault exists in the GENERATOR Charge Warning circuit. Refer to Diagnostic Chart B in Cell 30 for Charging System Diagnosis.

CIRCUIT OPERATION

The HEADLAMPS receive battery voltage through the LH and RH Headlamp Fuses at all times. When the LIGHT SWITCH is in the HEAD position, a ground is provided through the DAYTIME RUNNING LAMPS CONTROLLER, the JUNCTION BLOCK, the COMBINATION TURN SIGNAL/DIMMER SWITCH, and

the LIGHT SWITCH at G203. When the LIGHT SWITCH is in the OFF or the PARK position, a ground is provided through the DAYTIME RUNNING LAMPS CONTROLLER and the DAYTIME RUNNING LAMPS RESISTOR at G200 provided that all conditions for Daytime Running Light operation are met. High and low-beam selection is provided by grounding the high

and low-beam filaments separately. The high-beam filaments are grounded through the COMBINATION TURN SIGNAL/DIMMER SWITCH at G203. The low-beam filaments are grounded through the DAYTIME RUNNING LAMPS CONTROLLER, the JUNCTION BLOCK, the COMBINATION TURN SIGNAL/DIMMER SWITCH, and the LIGHT SWITCH at G203.

HEADLIGHTS: DAYTIME RUNNING LIGHTS

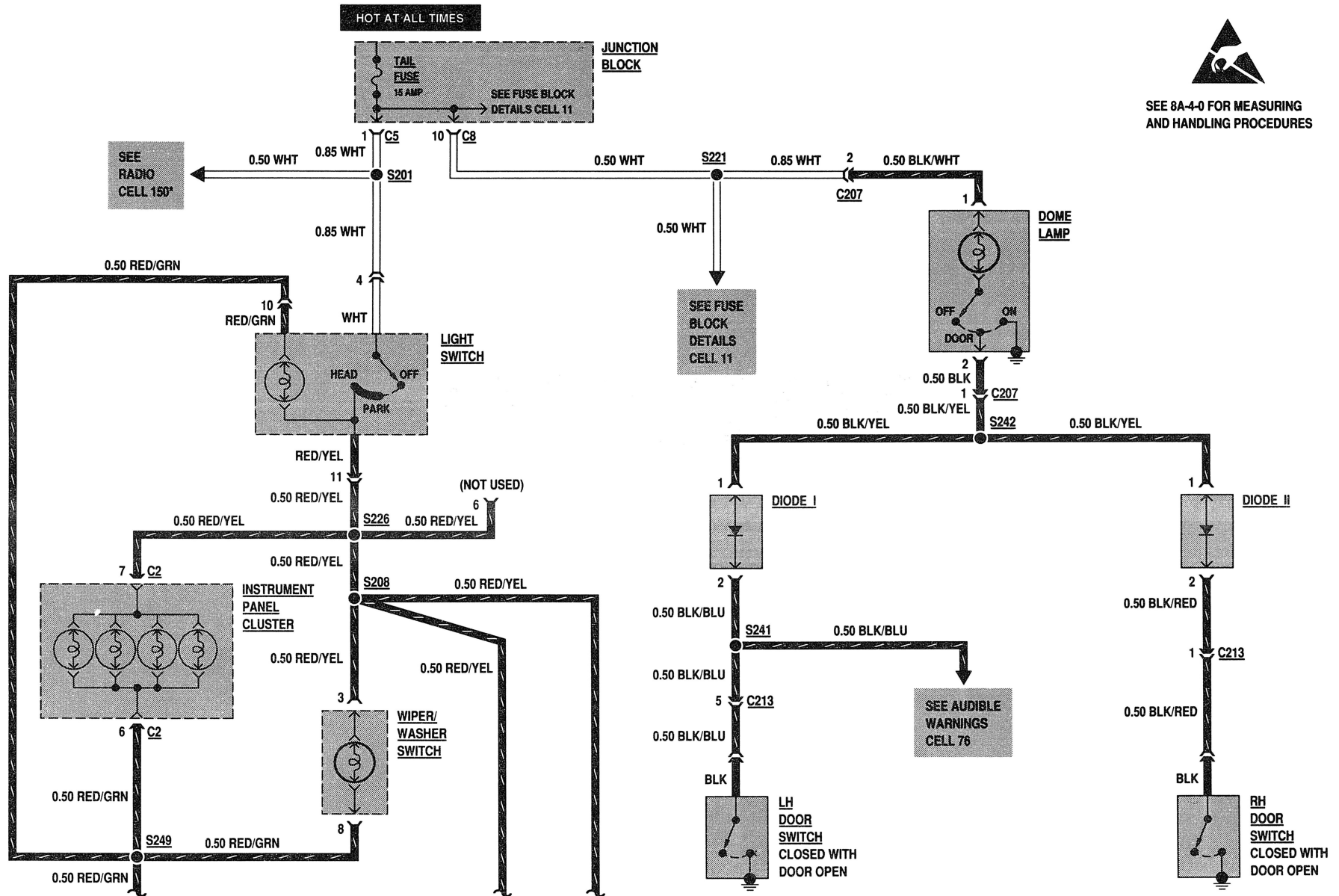
The Daytime Running Lights (DRL) system operates the low-beam HEADLAMPS at a lower intensity than the vehicle's regular low beams. Daytime Running Light system operation is initiated when the DAYTIME RUNNING LAMPS CONTROLLER senses the following:

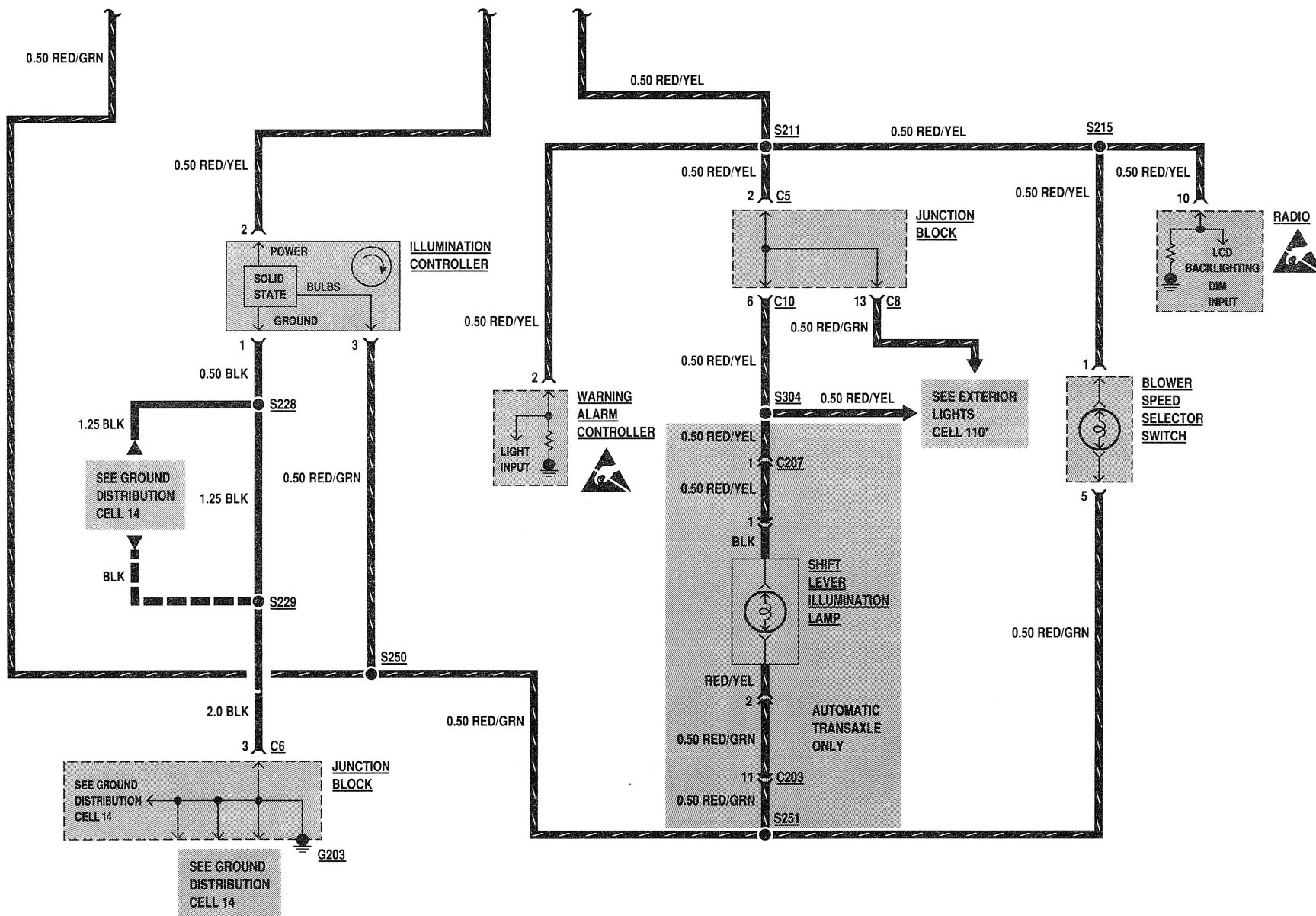
- A charge input signal from the generator (indicating an "engine running" condition) at terminal 5.
- No ground signal from the PARKING BRAKE SWITCH (indicating that the parking brake is not engaged) at terminal 4.
- A lights OFF signal (indicating the LIGHT SWITCH is in the "OFF" or "PARK" position) at terminal 11.

The DAYTIME RUNNING LAMPS CONTROLLER receives battery voltage for system operation at terminal 7 from the Ignition Fuse whenever the ignition switch is in the "ON" or "START" position. The CONTROLLER is permanently grounded through G203 at terminal 8.

BLANK

INTERIOR LIGHTS





* Refer to 1990 Geo METRO ELECTRICAL DIAGNOSIS SERVICE MANUAL SUPPLEMENT (ST370-90 EDM)

INTERIOR LIGHTS

COMPONENT	LOCATION	FIGURE	CONNECTOR
Blower Speed Selector Switch	Center of I/P below Radio	201-04/B	202-00/B3
Diode I	Near LH Grommet of Main Harness		
Diode II	Near RH Grommet of Main Harness		
Dome Lamp	Center Windshield Header area		
Illumination Controller	LH I/P left of Steering Column	201-04/B	
Instrument Panel Cluster	LH Dash	201-04/B	
C2 (12 Terminals)	I/P Harness to I/P Cluster, behind upper LH corner of I/P Cluster	201-04/B	81-08
Junction Block	Behind LH I/P	201-07/B	
C5 (16 Cavities)	I/P Harness to Junction Block, behind LH I/P	201-07/B	202-02/C1
C6 (3 Cavities)	I/P Harness to Junction Block, behind LH I/P		
C8 (14 Cavities)	Main Harness to Junction Block, behind LH I/P	201-05/A	202-03/B1
C10 (6 Cavities)	Floor Harness to Junction Block, behind LH I/P	201-06/A	202-00/A2
LH Door Switch	LH Door Frame	201-06/A	
Light Switch	LH side of Cluster Switch Panel	201-04/B	202-00/B2
Radio	Center of I/P	201-04/B	202-00/C1
RH Door Switch	In RH Door Frame	201-06/A	
Shift Lever Illumination Lamp (Automatic Transaxle Only)	Center of Passenger Compartment on Floor	201-06/A	
Warning Alarm Controller	Lower I/P left of Steering Column	201-04/B	202-02/A2
Wiper/Washer Switch	RH side of Cluster Switch Panel	201-04/B	202-02/A1
C203 (12 Cavities)	I/P Harness to Floor Harness, near Junction Block	201-06/A	202-00/B2
C207 (2 Cavities)	Main Harness to Dome Lamp Harness, RH Upper Cowl	201-05/A	
C213 (10 Cavities)	Main Harness to Floor Harness, behind I/P near Junction Block	201-05/A	202-02/B3
S201	I/P Harness, behind LH I/P	201-04/B	
S208	I/P Harness, behind LH I/P	201-04/B	
S211	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S215	I/P Harness, behind LH I/P near Blower Speed Selector Switch	201-04/B	
S221	Main Harness, at base of Engine Harness Branch	201-05/A	
S226	I/P Harness, behind LH I/P near Illumination Controller	201-04/B	
S228	I/P Harness, behind LH I/P	201-04/B	
S229	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S241	Main Harness, near Junction Block	201-05/A	
S242	Main Harness, near Junction Block	201-05/A	

INTERIOR LIGHTS

ITEM	DESCRIPTION	FIGURE	CONNECTOR
S249	I/P Harness, behind LH I/P	201-04/B	
S250	I/P Harness, behind LH I/P	201-04/B	
S251	I/P Harness, behind LH I/P near Junction Block	201-04/B	
S304	Floor Harness, near base of Safety Belt Switch Branch	201-06/A	
G203	Junction Block Case Ground, under LH I/P	201-08/A	

TROUBLESHOOTING HINTS

1. For lamps that will not light:
 - Check the Tail Fuse with a fuse tester.
 - Note the condition of the ground wires for the affected lamps.
 - Check for burned out bulbs.
2. If Dome Lamp will not go out, note the condition of the ground wires.

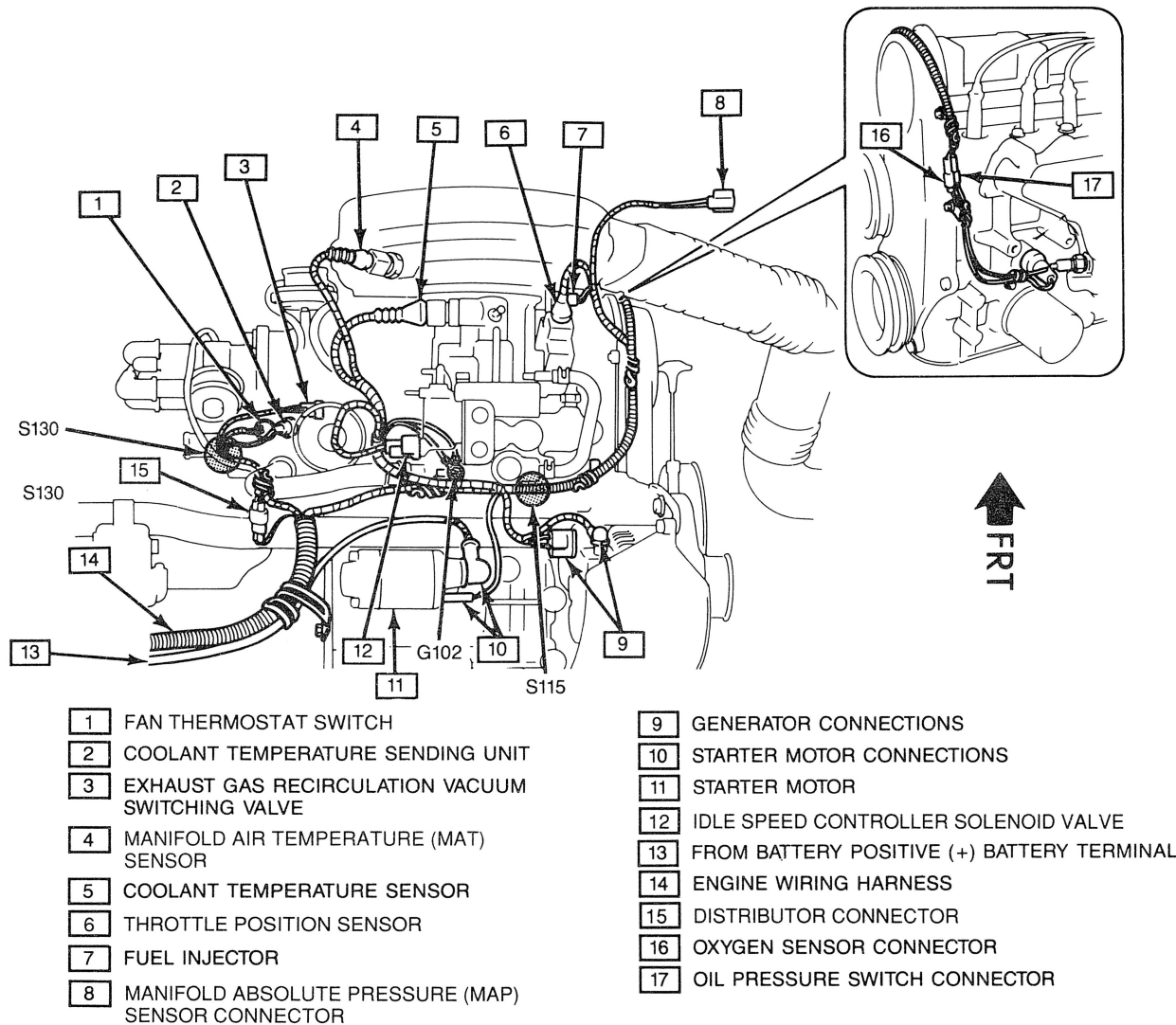


Figure A - Engine Wiring

COMPONENT LOCATION VIEWS

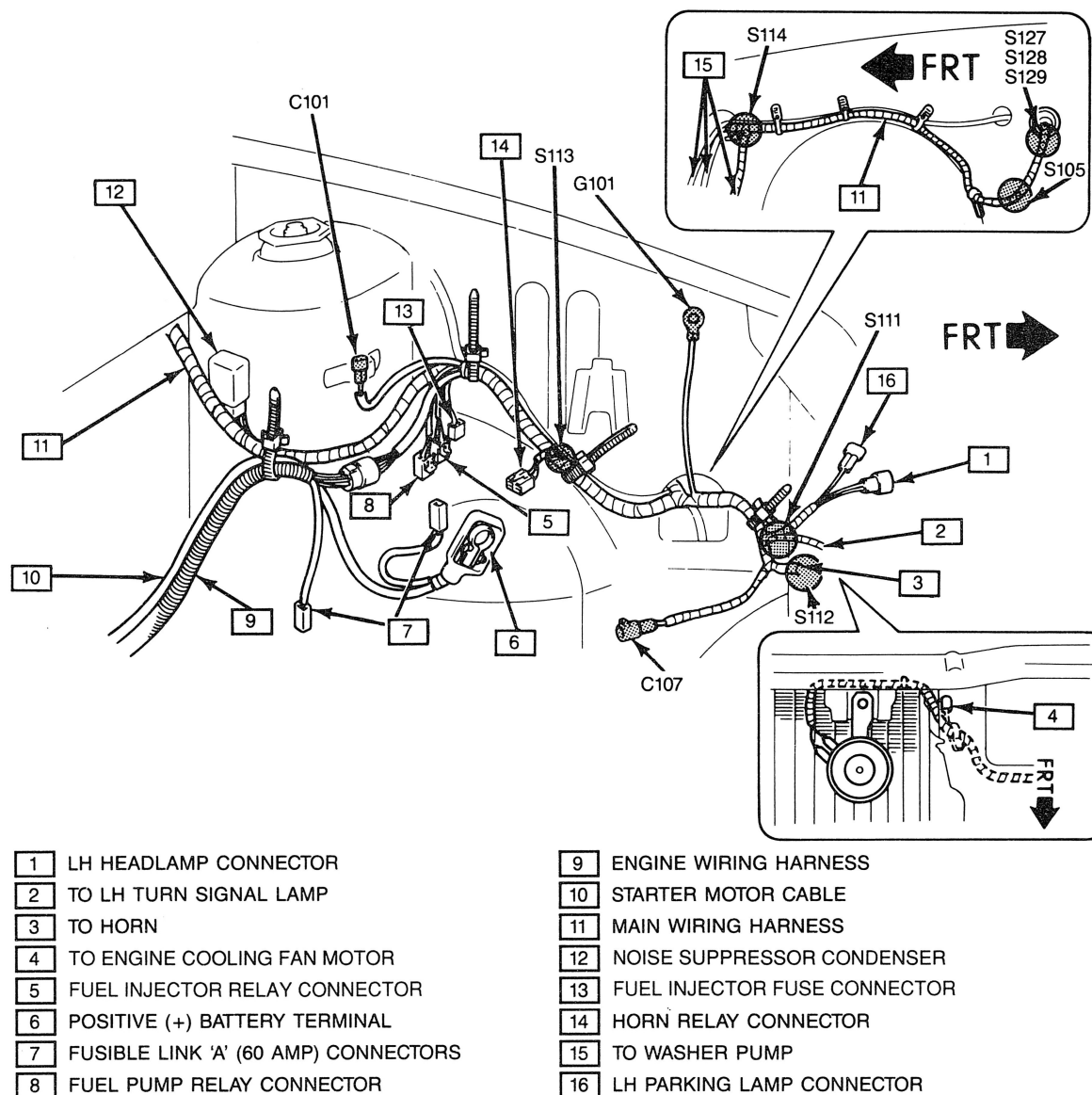


Figure A - LH Fender Apron Wiring

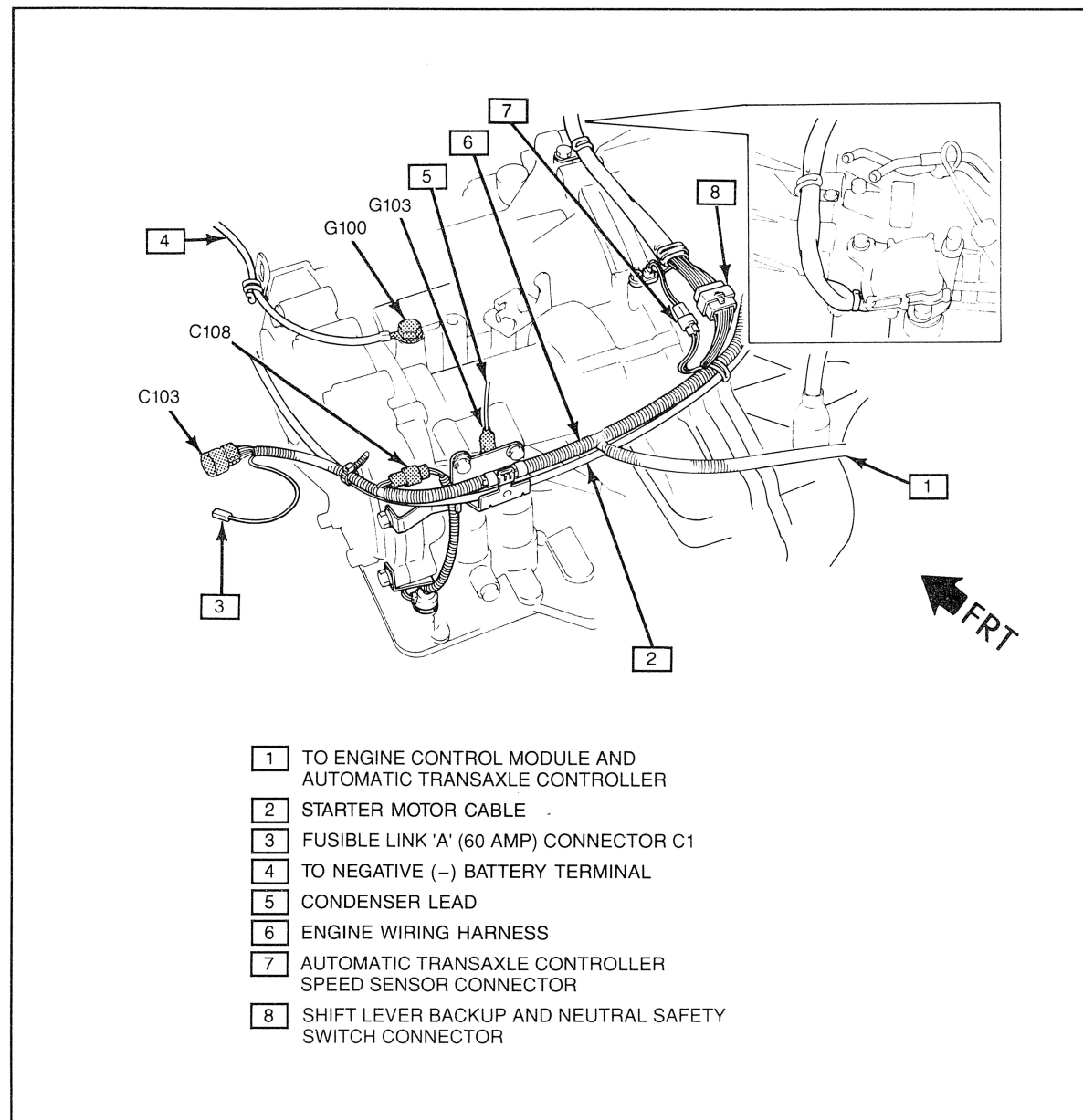


Figure A - Automatic Transaxle Wiring

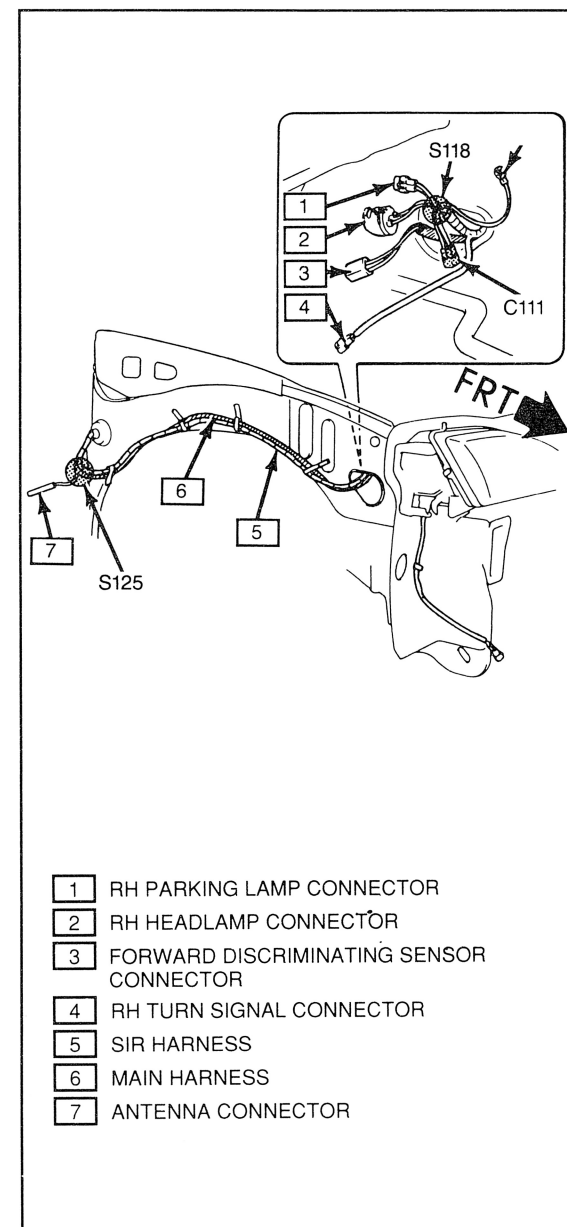
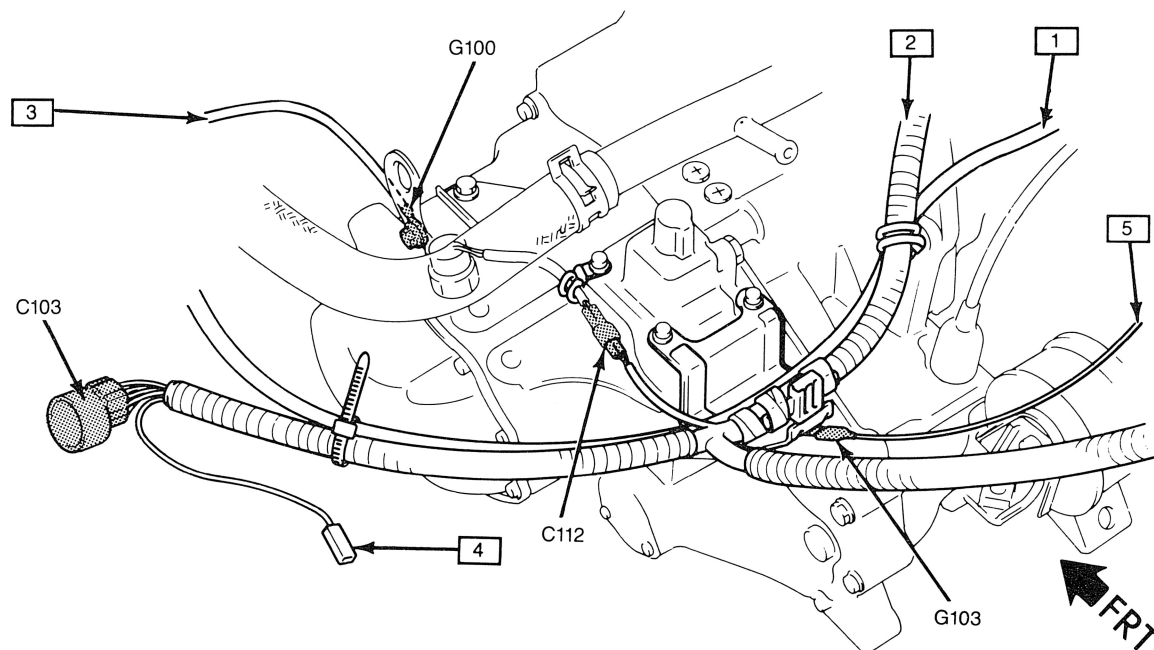


Figure B - RH Inner Fender Wiring

COMPONENT LOCATION VIEWS



- 1** STARTER MOTOR CABLE
- 2** ENGINE WIRING HARNESS
- 3** TO NEGATIVE (-) BATTERY TERMINAL
- 4** FUSIBLE LINK 'A' (60 AMP) CONNECTOR
- 5** CONDENSER LEAD

Figure A - Manual Transaxle Wiring

COMPONENT LOCATION VIEWS

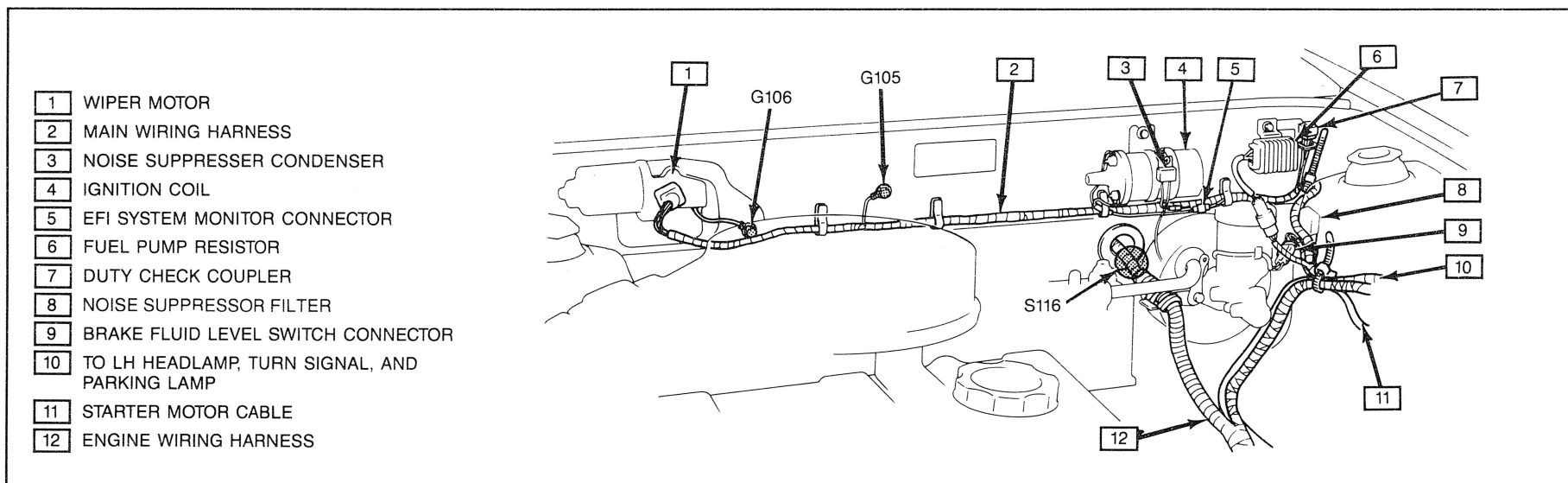


Figure A - Cowl Top Panel Wiring

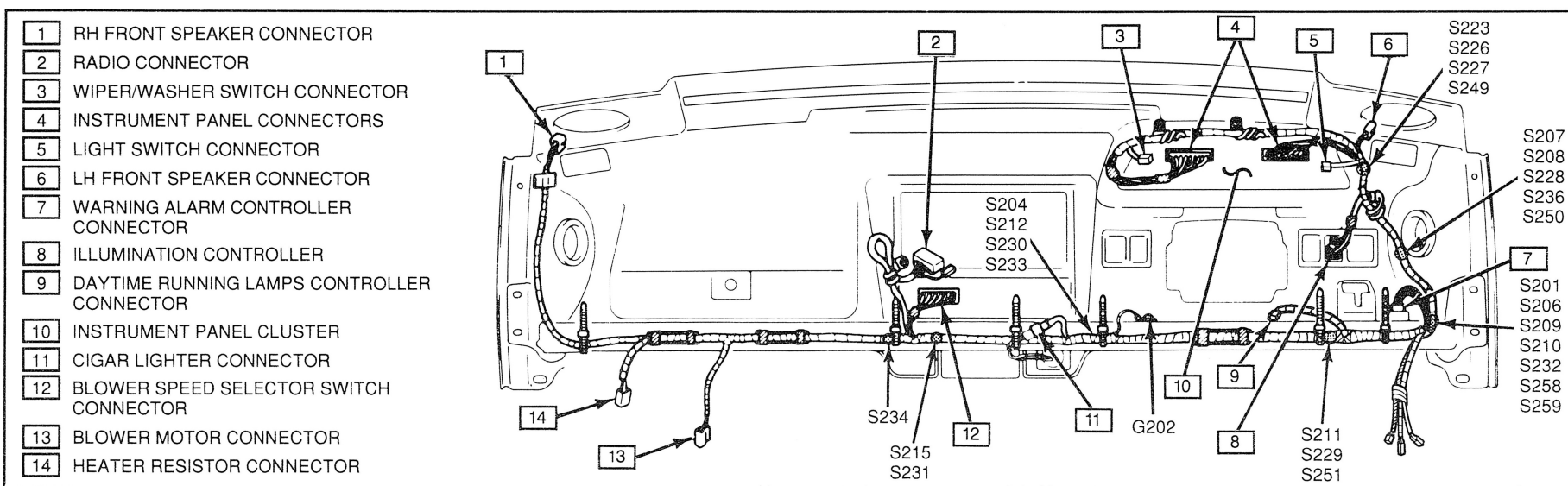


Figure B - Instrument Panel Wiring

COMPONENT LOCATION VIEWS

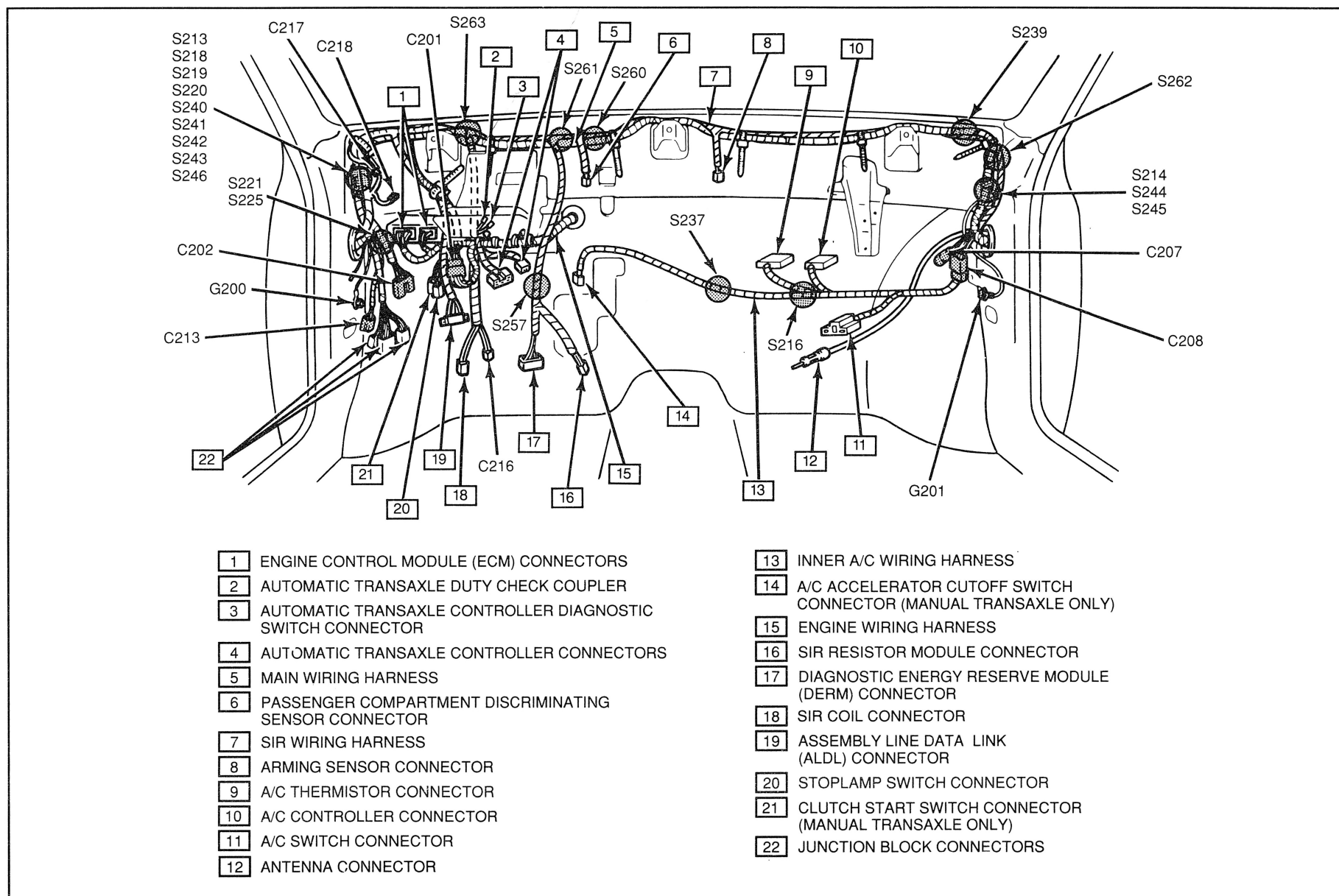
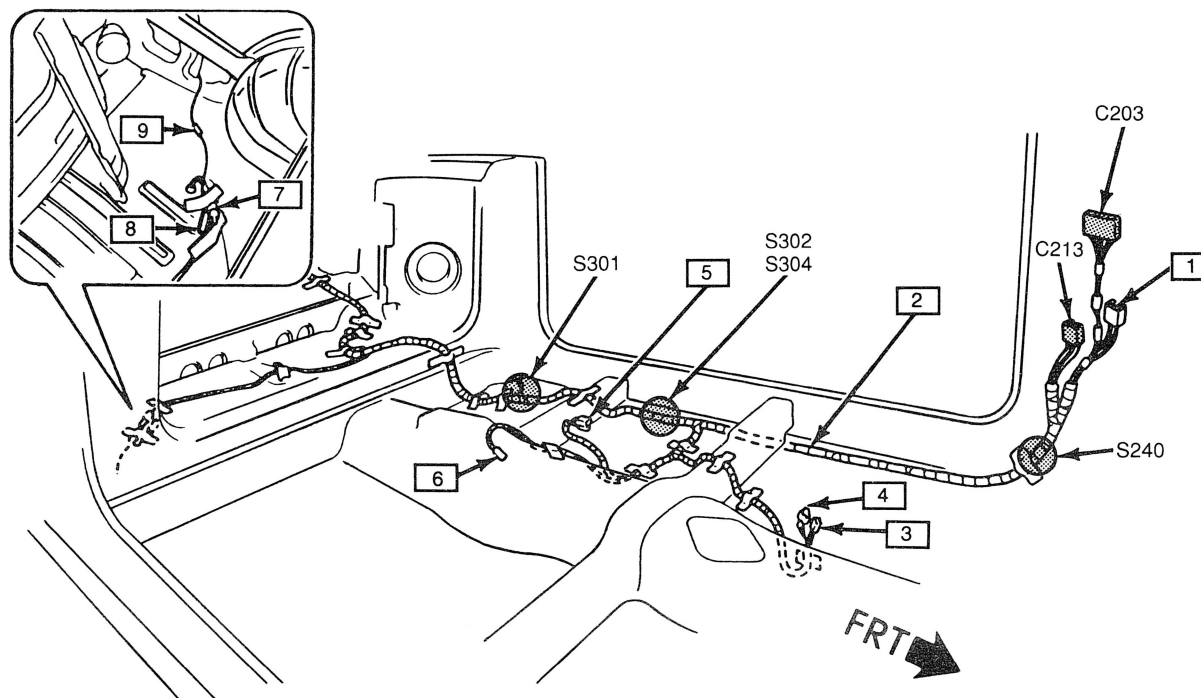


Figure A - Cowl Upper Wiring



- 1 JUNCTION BLOCK CONNECTOR C10
- 2 FLOOR WIRING HARNESS
- 3 AUTOMATIC TRANSAXLE SHIFT LEVER ILLUMINATION LAMP CONNECTOR
- 4 AUTOMATIC TRANSAXLE SHIFT LOCK SOLENOID CONNECTOR

- 5 DRIVER'S SAFETY BELT SWITCH CONNECTOR
- 6 PARKING BRAKE SWITCH CONNECTOR
- 7 FUEL PUMP CONNECTOR
- 8 FUEL GAGE CONNECTOR
- 9 RH DOOR SWITCH CONNECTOR

Figure A - Floor Wiring

COMPONENT LOCATION VIEWS

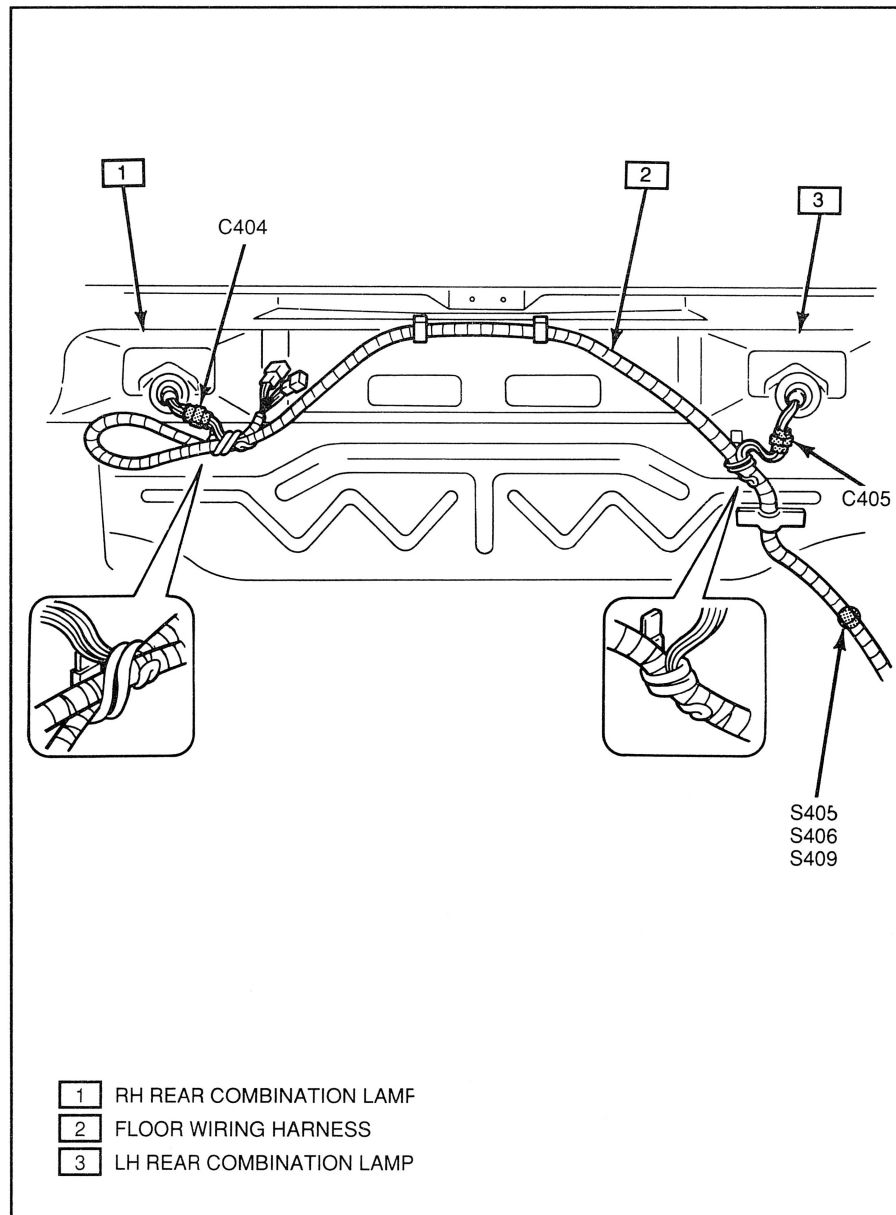


Figure A - Rear Body Wiring

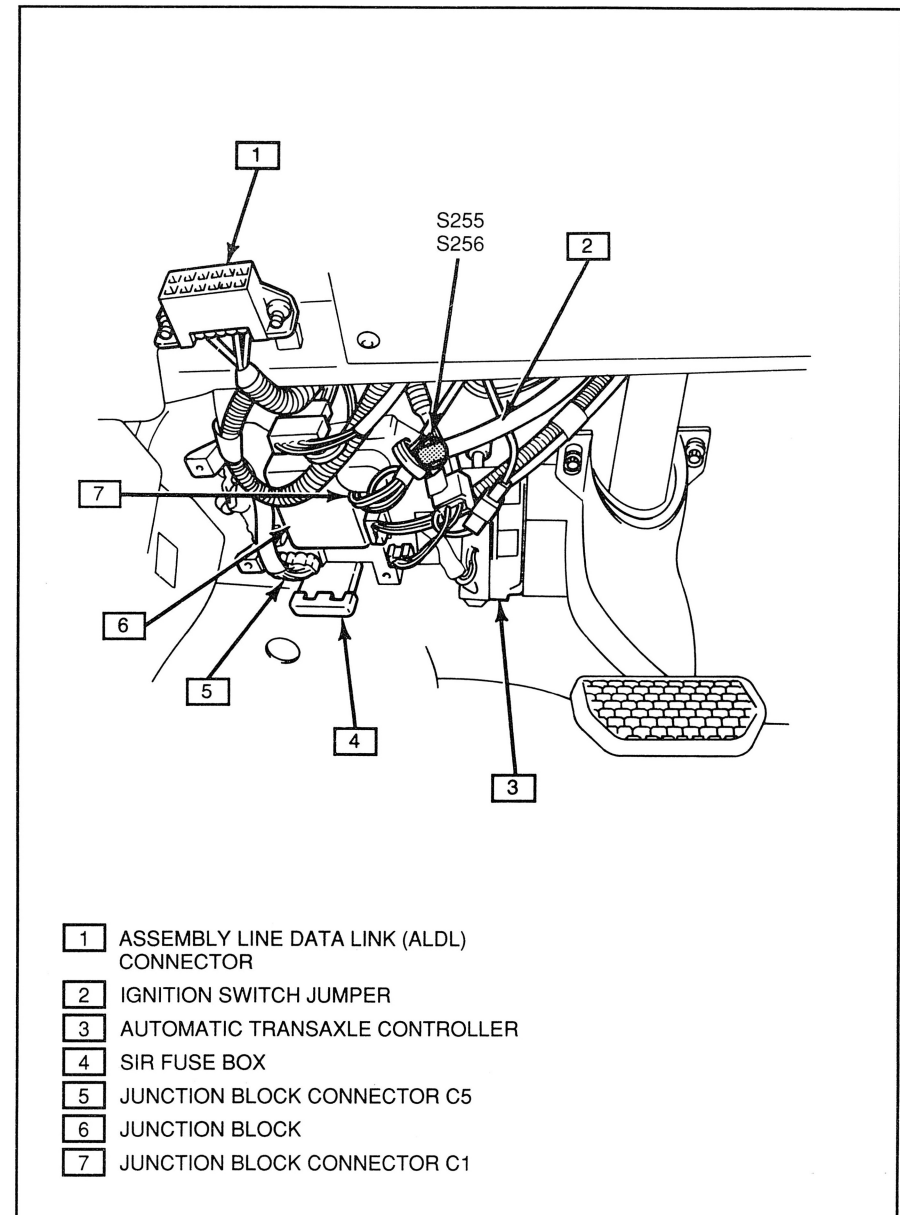


Figure B - Under LH I/P

COMPONENT LOCATION VIEWS

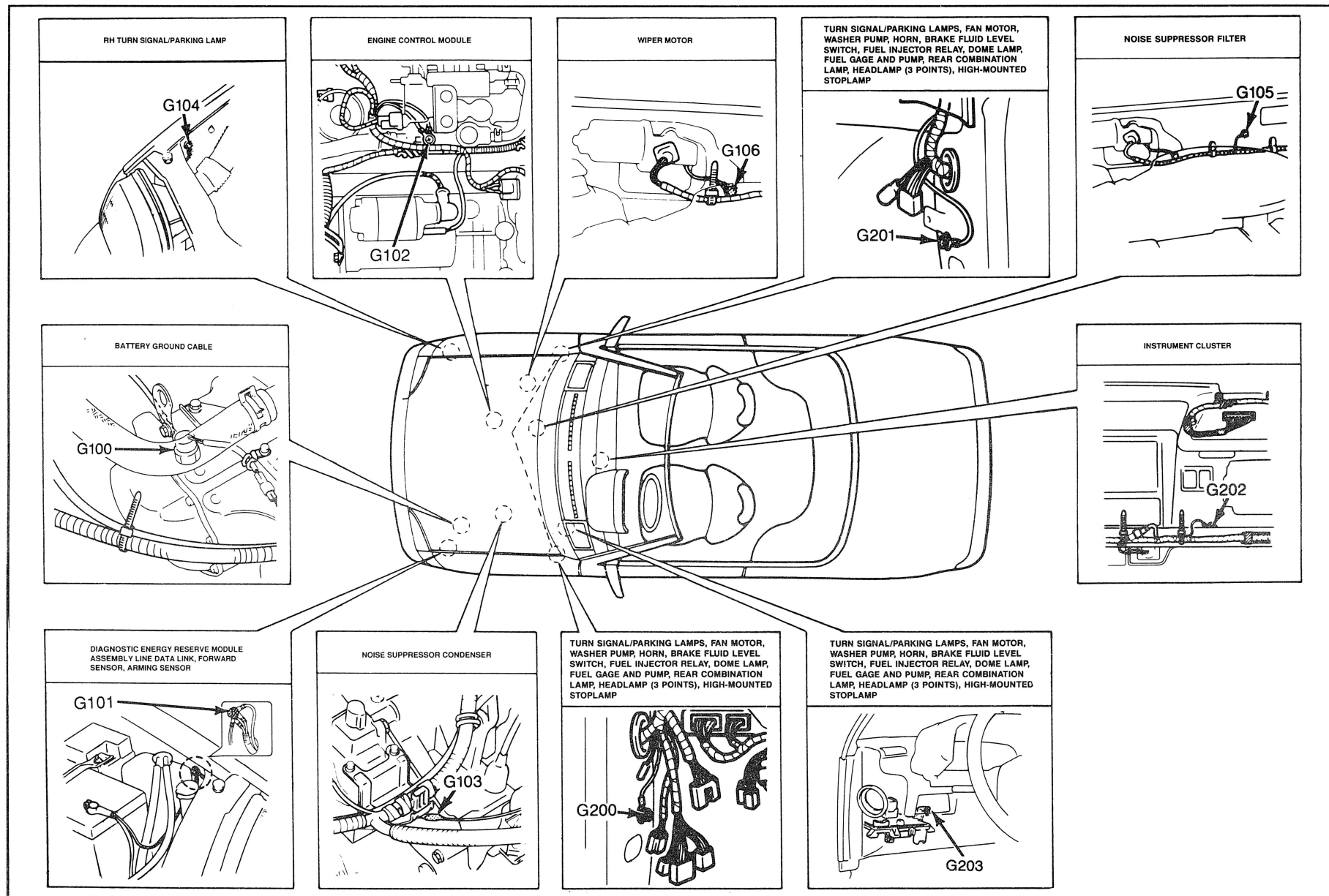
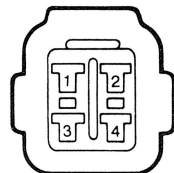


Figure A - Grounding Points

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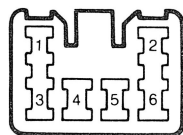
HARNESS CONNECTOR FACES

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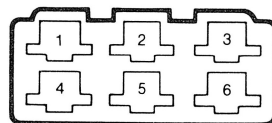
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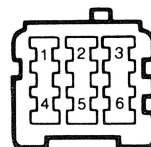
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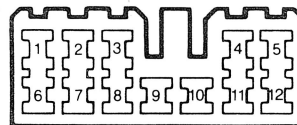
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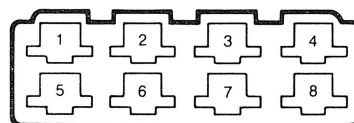
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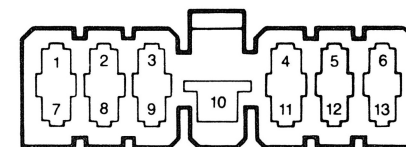
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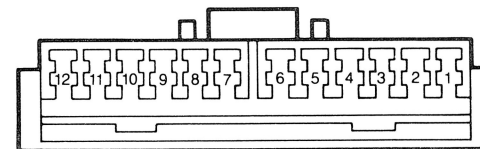
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C1



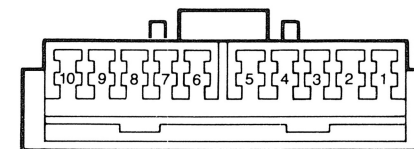
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C2



NAT

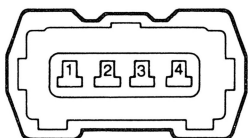
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NAT

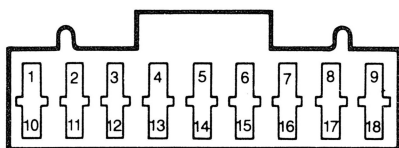
HARNESS CONNECTOR FACES

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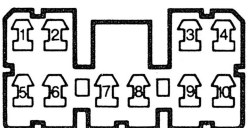
BLK

A2



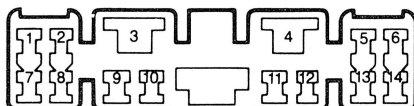
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A3



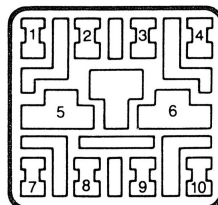
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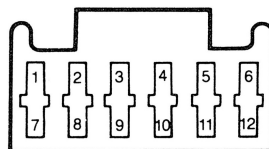
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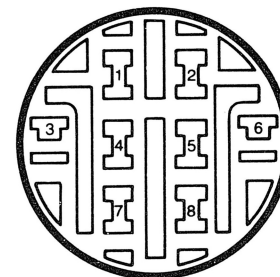
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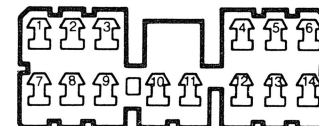
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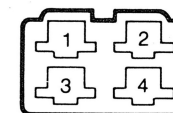
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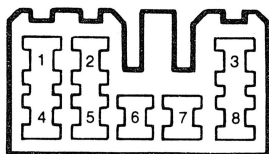
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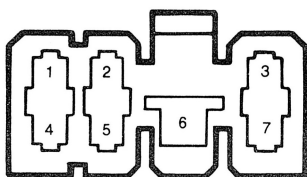
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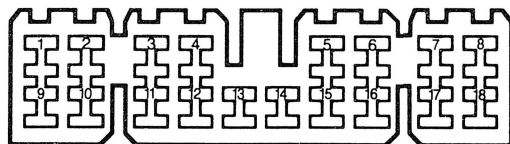
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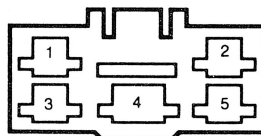
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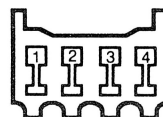
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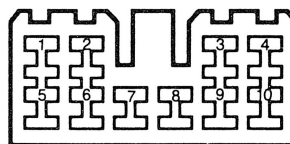
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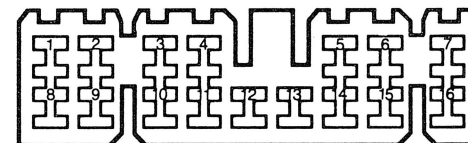
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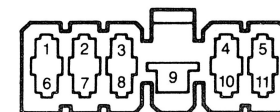
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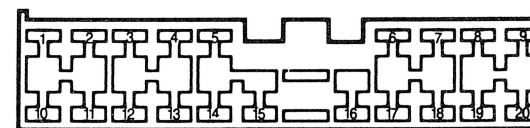
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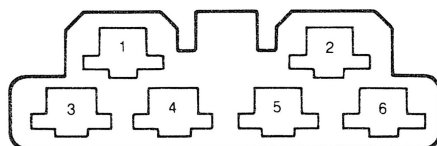
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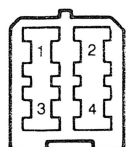
HARNESS CONNECTOR FACES

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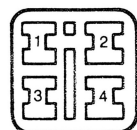
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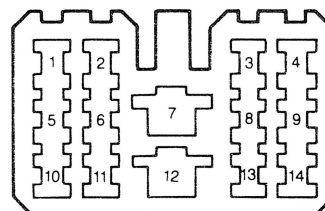
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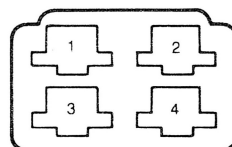
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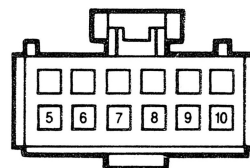
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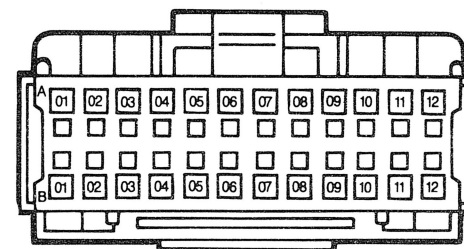
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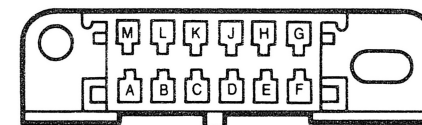
YEL

C1



YEL

C2



BLK

C3

SECTION 8B

LIGHTING SYSTEMS AND HORN

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: The procedures in this section must be followed in the order listed to temporarily disable the Supplemental Inflatable Restraint (SIR) System and prevent false diagnostic codes from setting. Failure to follow procedures could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

EXTERIOR LIGHTING

Backup Lamps

The backup lamps, located in the rear combination lamps, are designed to operate with the ignition in the "ON" position. Placing the shift lever in "R" closes the circuit and turns the backup lamps on. This is accomplished through the Backup Lamp Switch (Manual Transaxle) or the Shift Lever Backup and Neutral Safety Switch (Automatic Transaxle).

Center High-Mounted Stoplamp

The center high-mounted stoplamp is located in the center rear of the deck lid. The center high-mounted stoplamp operates simultaneously with the stoplamps whenever the brake pedal is pressed.

Daytime Running Lamps (Canadian Vehicles Only)

Daytime Running Lamps are standard equipment on models of this vehicle which are designated for sale in Canada. There is a Daytime Running Lamps (DRL) indicator on the instrument panel of these vehicles. Operating through the low beams at a lower than normal output, the DRL system operates under the following conditions:

1. The engine is running.
2. The parking brake is not applied.
3. The headlamp switch is in either the OFF or PARK position.

For DRL system diagnosis, refer to ELECTRICAL DIAGNOSIS (SEC.8A).

Front Parking Lamps

The front parking lamp assembly is located in the fender above the bumper and operates whenever the

parking lamps are on. The front parking lamp is amber in color and contains a reflector to alert approaching vehicles for nighttime driving safety.

Front Turn Signal Lamps

The front turn signal lamp assembly is located in the front bumper face bar. It consists of a clear lens and a dual filament park/turn signal bulb.

Hazard Flasher

A hazard flasher is included in the turn signal circuit. Pushing the switch (red button on the top left side of the instrument panel) will disconnect the regular turn signal flasher and energize the hazard flasher. The hazard flasher will work with the ignition either "OFF" or "ON." The turn signals will not work with the hazard flasher on. Pressing the switch again will turn the hazard flasher off.

When the hazard flasher is operating, the turn signal indicator lamps and all front and rear turn signal lamps will flash. If the brake pedal is depressed while the hazard flasher is operating, only the high-mounted stoplamp will light continuously. (Hazard lamps will continue to flash.)

Headlamps

The composite headlamps consist of two interchangeable Halogen bulbs which provide both high and low beams. The headlamps are adjustable using a J 25300 Headlamp Aimer and a J 25300-203 Composite Headlamp Adapter Kit as shown in "Special Tools."

CAUTION: Always wear eyeglasses and protective clothing when handling a broken or damaged high-intensity headlamp. These headlamps contain a pressure-filled inner Halogen cycle bulb which could explode if scratched or damaged, causing personal injury to persons in the vicinity due to flying glass. Carefully place the damaged unit in a suitable trash receptacle.

License Plate Lamps

There are two license plate lamps, one located on the inside of each rear combination lamp.

Rear Combination Lamps

The rear combination lamps contain the stop/taillamps, the turn signal lamps, the rear side marker lamps, the license plate lamps and the backup lamps.

The side rear side marker lamps are located on the outside of each rear combination lamp. The lamps operate in conjunction with the taillamp circuit. They are activated when the parking lamps or headlamps are switched on.

The rear turn signal lamps consist of an amber lens and a singular filament turn signal bulb.

The stop/taillamps consist of a red lens and a two filament stop/taillamp bulb.

INTERIOR LIGHTING

Dome Lamp

The dome lamp is located in the center of the windshield header area. It consists of a clear lens, a dome lamp bulb and a three position switch. When the switch is in the far left position the lamp is off. When the switch is in the far right position the lamp is on. With the switch in the center position, the lamp will light when either door is open.

LAMP SWITCHES

Light Switch

The light switch is located in the cluster switch panel, left of the cluster. When the switch is in the PARK position it activates the instrument panel lamps, front parking lamps, front side marker lamps, taillamps, license plate lamps and rear side marker lamps. When the switch is in the HEAD position, all of these lamps plus the headlamps are illuminated. There is an alarm wired into the light switch that sounds if the switch is in the PARK or HEAD position, the left door is open and the ignition switch is in the "OFF" position. For removal and installation procedures, refer to INSTRUMENT PANEL, CONSOLE AND GAGES (SEC.8C).

Turn Signal Operation

Turn signal lamps are independent lamps in the front and rear. The ignition switch must be in "ON" for the turn signal lamps to be operated with the turn signal switch.

The lane-change turn signal switch is standard equipment. When making a partial turn, such as when changing lanes, the driver has the option of moving the switch lever to a detent stop. The signal lamps will continue to flash as long as the lever is held in this position and will cancel automatically when the lever is released. By using the detent position, a shallow turn or lane change can be signaled without possibility of failure to cancel. Moving the turn signal switch lever past the detent position to the limit of its travel for either turn will provide conventional turn signal operation.

With the light switch in the "HEAD" position, the turn signal lever functions also as the headlamp dimmer switch. Pushing the lever forward will switch the headlamps to high-beam operation. Pulling the lever to the middle position switches the headlamps to low-beam operation. Pulling the lever all the way toward the driver will flash the high beams. The flash function will work even if the light switch is in the OFF or PARK position. For removal and installation procedures, refer to SUPPLEMENTAL INFLATABLE RESTRAINT STEERING COLUMN UNIT REPAIR (SEC.3F4A).

HORN

The horn is located under the hood, attached to the radiator core support on the left side. The horn is actuated by depressing either horn button on the steering wheel. Pressing the horn buttons grounds the

horn electrical circuit. Refer to the 1990 Geo Metro Electrical Diagnosis Service Manual Supplement for additional details of the horn electrical circuit.

DIAGNOSIS

LIGHTING SYSTEM

Malfunctions in the lighting circuits are caused by loose connections, open or shorted wiring, burned out bulbs, inoperative switches, inadequate grounds or blown fuses. In each, diagnosis requires following through the circuits until the source of the difficulty is found. Refer to the 1990 Geo Metro Electrical Diagnosis Service Manual Supplement for details of headlamp diagnosis.

HORN

Horn Does Not Sound

Refer to the 1990 Geo Metro Electrical Diagnosis Service Manual Supplement.

Horn Tone Poor

1. Harsh tone - caused by loose bolts in sheet metal mounting area.
2. Weak strained tone - possible foreign body in horn that should be shaken out or removed.
3. Harsh vibration - caused by horn touching sheet metal. Bracket should be bent to give horn clearance and freedom from interference.

Horn Sounds Constantly

1. This can be caused by sticking horn contacts in the relay or horn pad.
2. Horn relay may be energized by wiring shorted to ground.

Burned (open) windings on most horns are caused by one of the above malfunctions. Before horns with open windings are replaced, make sure that none of the above conditions exist, or the horn windings will again burn open.

Bench Checks

1. Measure current draw of horn while horn is operating. Current draw for each horn should be between 4.5 and 5.5 amperes at 11.5 to 12.5 volts.
2. No current may indicate an open circuit. Most horn problems are caused by horns being operated continuously, which develops sufficient heat to melt the wires in the winding, causing an open circuit. Overheating is accompanied by a characteristic odor, which indicates that the horn has overheated and should be replaced.
3. No current can also indicate that the contact points are open and a current adjustment is required.
4. High current, over 20 amperes, indicates an overheated winding or shorted horn.
5. A reading of approximately 18 amperes for a 12-volt horn indicates a condition in which the

contact points are not opening. A current adjustment is required.

ON-VEHICLE SERVICE

SERVICE PRECAUTIONS

The DERM can maintain sufficient voltage to cause a deployment for up to 10 minutes after the ignition switch is turned "OFF" and the battery is disconnected. Many of the service procedures require disconnection of the SIR IG Fuse and Inflator Module from the deployment loop to avoid an accidental deployment. Diagnostic procedures do not normally require fuse removal or disconnection of the Inflator Module. Always refer to GM service procedures for diagnosis.

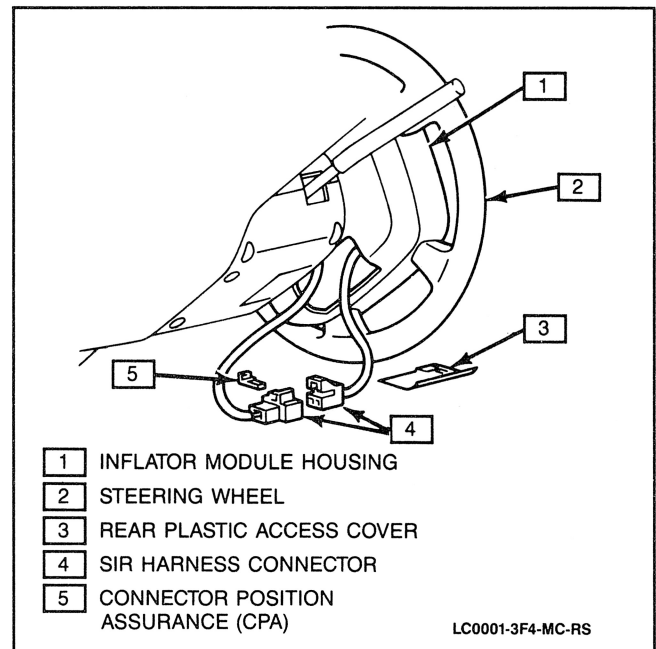


Figure 1 SIR Harness Connector

Disabling the SIR System

Figure 1



Remove or Disconnect

- Turn ignition switch to "OFF."
- 1. SIR IG Fuse from the SIR fuse block.
- 2. Rear plastic access cover from inflator module housing.
- 3. Connector position assurance (CPA) and yellow two-way connector inside the inflator module housing.

Enabling the SIR System

Figure 1



Install or Connect

- Turn ignition switch to "OFF."
- 1. Yellow two-way connector and connector position assurance (CPA) inside the inflator module housing.

2. SIR IG Fuse to the SIR fuse block.
3. Rear plastic access cover to inflator module housing.
 - Turn ignition switch to "ON." Observe "INFLATABLE RESTRAINT" indicator lamp. If lamp does not flash 7 to 9 times and then remain off, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).

EXTERIOR LIGHTING

Backup Lamps

Figure 2

Remove or Disconnect

1. Battery negative (-) cable.
2. Two screws securing rear combination lamp assembly to vehicle.
3. Rear combination lamp assembly by pulling assembly rearward and upward.
4. Backup lamp socket from lamp assembly.
5. Bulb from socket.

Install or Connect

1. Bulb to socket.
2. Socket to lamp assembly.
3. Rear combination lamp assembly to vehicle.
4. Two screws securing rear combination lamp assembly to vehicle.

5. Battery negative (-) cable.

Center High-Mounted Stoplamp

Figure 3

Remove or Disconnect

1. Battery negative (-) cable.
2. Two screws inside deck lid securing lamp assembly.
3. Lamp assembly from deck lid.
4. Lamp socket from lamp assembly.
5. Bulb from lamp socket.

Install or Connect

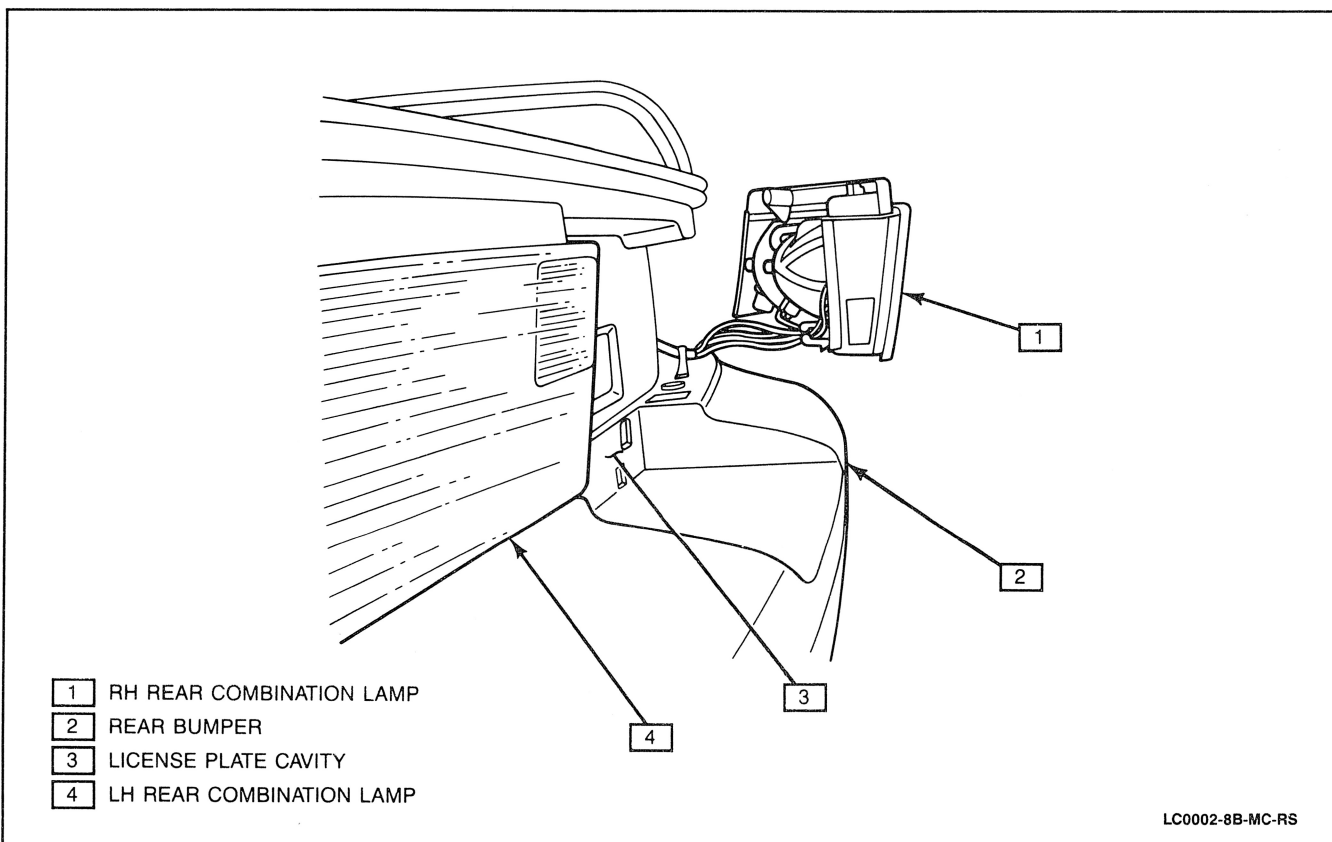
1. Bulb to lamp socket.
2. Lamp socket to lamp assembly.
3. Lamp assembly to deck lid.
4. Two screws inside deck lid securing lamp assembly.
5. Battery negative (-) cable.

Daytime Running Lamps Controller

Figure 4

Remove or Disconnect

1. Battery negative (-) cable.
2. Two screws and lower steering column trim panel.



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Figure 2 Rear Combination Lamps

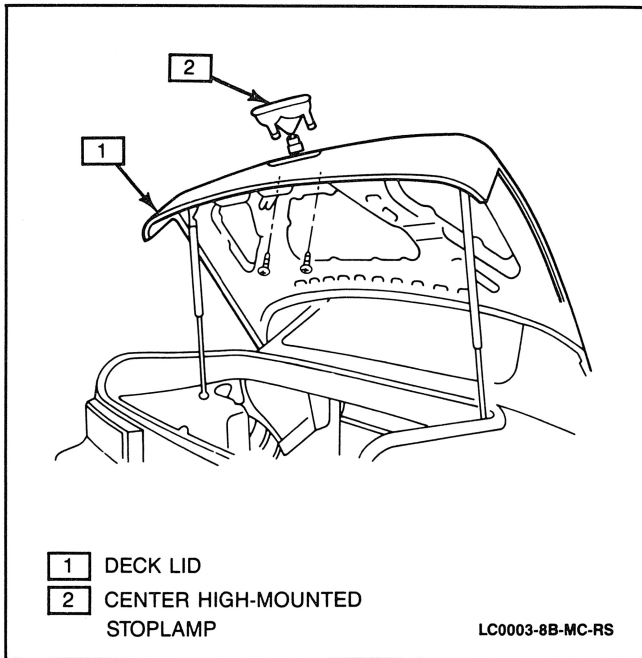


Figure 3 Center High-Mounted Stoplamp

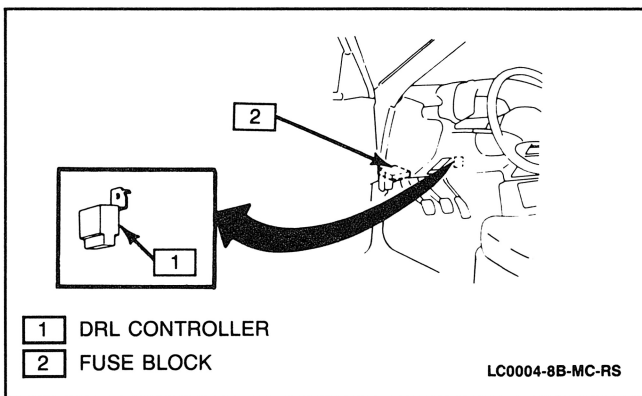


Figure 4 Daytime Running Lamps Controller

3. Two screws and steering column reinforcement plate.
4. Electrical connector to daytime running lamps controller.
5. Daytime running lamps controller mounting screws.
6. Daytime running lamps controller.

→← Install or Connect

1. Daytime running lamp controller; secure with mounting screws.
2. Electrical connector to daytime running lamps controller.
3. Steering column reinforcement plate, securing with 2 screws.
4. Lower steering column trim panel; secure with 2 mounting screws.
5. Battery negative (-) cable.

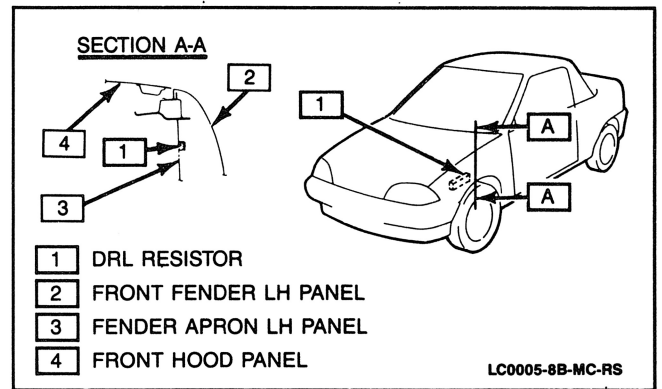


Figure 5 Daytime Running Lamps Resistor

Daytime Running Lamps Resistor

Figure 5

↔ Remove or Disconnect

1. Battery negative (-) cable.
2. Five screws and 4 clips securing inner fender.
3. Plastic inner fender.
4. Engine coolant reservoir.
5. Electrical connector from daytime running lamps resistor.
6. Two screws securing daytime running lamps resistor.
7. Daytime running lamps resistor from vehicle.
8. Bracket from daytime running lamps resistor.

→← Install or Connect

1. Bracket to daytime running lamps resistor.
2. Daytime running lamps resistor to vehicle.
3. Two screws securing daytime running lamps resistor to vehicle.
4. Electrical connector to daytime running lamps resistor.
5. Engine coolant reservoir.
6. Plastic inner fender.
7. Five screws and 4 clips securing inner fender.
8. Battery negative (-) cable.

Flasher (Turn and Hazard)

↔ Remove or Disconnect

1. Battery negative (-) cable.
2. Flasher unit from junction block.

→← Install or Connect

1. Flasher unit to junction block.
2. Battery negative (-) cable.

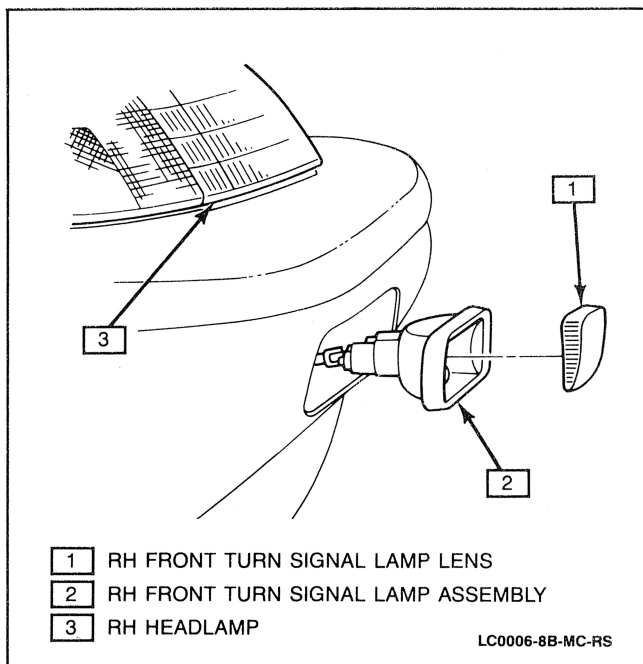


Figure 6 Front Turn Signal Lamp

Front Turn Signal Lamps

Figure 6

Remove or Disconnect

1. Battery negative (-) cable.
2. Two screws securing front turn signal lamp assembly.
3. Lens from front turn signal lamp assembly.
4. Bulb from front turn signal lamp assembly.

Install or Connect

1. Bulb to front turn signal lamp assembly.
2. Lens to front turn signal lamp assembly.
3. Two screws securing front turn signal lamp assembly.
4. Battery negative (-) cable.

Front Parking Lamps

Figure 7

Remove or Disconnect

1. Battery negative (-) cable.
2. Two screws securing front parking lamp assembly.
3. Front parking lamp assembly from vehicle.
4. Socket from lamp assembly.
5. Bulb from socket.

Install or Connect

1. Bulb to socket.
2. Socket to lamp assembly.

3. Front parking lamp assembly to vehicle.
4. Two screws securing front parking lamp assembly.
5. Battery negative (-) cable.

Headlamp Assembly

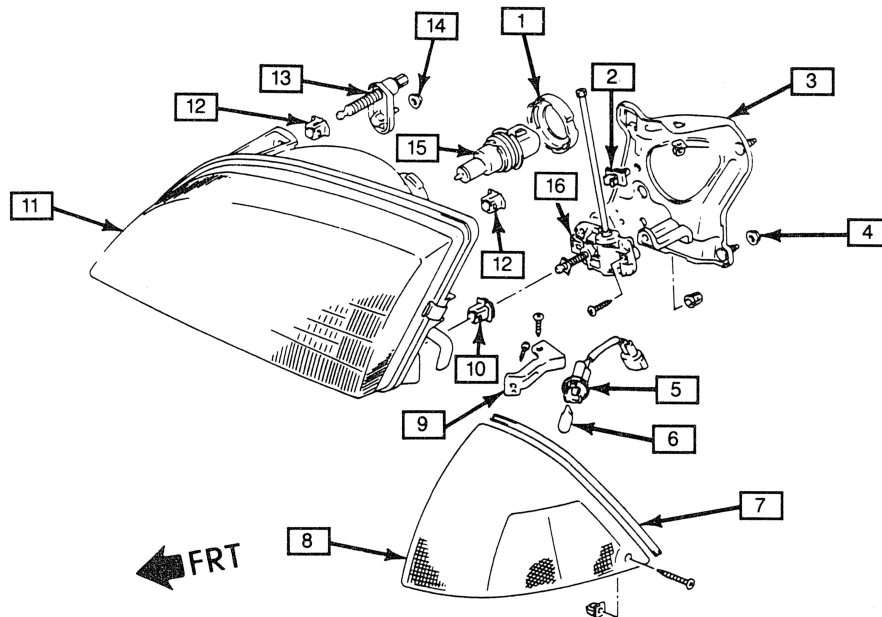
Figure 7

Remove or Disconnect

1. Battery negative (-) cable.
2. Composite bulb locking cap.
3. Composite bulb assembly from housing.
4. Composite bulb from assembly by pulling straight out.
5. Two screws securing front parking lamp assembly.
6. Front parking lamp assembly from vehicle.
7. Windshield washer fluid reservoir and pump as an assembly (left-side headlamp only). Refer to WINDSHIELD WIPER-WASHER SYSTEM (SEC.8E).
8. Three lower push pins and 1 attaching screw from the right-side fender skirt and push skirt back away from fender (right-side headlamp only).
9. Two mounting nuts from intake air baffle (right-side headlamp only).
10. Baffle, to gain access to the headlamp bracket (right-side headlamp only).
11. Two mounting nuts from the headlamp bracket.
12. One adjuster bolt assembly attaching nut from the assembly.
13. Headlamp composite assembly.
14. Upper and lower spherical bearings from the headlamp composite assembly.

Install or Connect

1. Upper and lower spherical bearings to the headlamp composite assembly.
2. Headlamp composite assembly.
3. One adjuster bolt assembly attaching nut to the assembly.
4. Two mounting nuts to the headlamp bracket.
5. Intake air baffle; secure with 2 nuts (right-side headlamp only).
- Reposition right-side fender skirt and secure with 3 lower push pins and 1 screw (right-side headlamp only).
6. Windshield washer fluid reservoir and pump as an assembly (left-side headlamp only). Refer to WINDSHIELD WIPER-WASHER SYSTEM (SEC.8E).
7. Front parking lamp assembly to vehicle; secure with 2 screws.
8. Composite bulb to assembly.



- | | |
|---------------------------------------|--|
| 1 HEADLAMP COMPOSITE BULB LOCKING CAP | 9 PARKING LAMP BRACKET |
| 2 ADJUSTING BOLT RETAINING CLIP | 10 LOWER SPHERICAL BEARING |
| 3 HEADLAMP BRACKET | 11 HEADLAMP CAPSULE HOUSING |
| 4 HEADLAMP BRACKET MOUNTING NUT | 12 UPPER SPHERICAL BEARING |
| 5 PARKING BULB SOCKET | 13 ADJUSTING BOLT ASSEMBLY |
| 6 PARKING BULB | 14 ADJUSTING BOLT ASSEMBLY ATTACHING NUT |
| 7 PARKING LAMP HOUSING SEAL | 15 HEADLAMP CAPSULE BULB ASSEMBLY |
| 8 PARKING LAMP HOUSING | 16 ADJUSTING BOLT & GEAR ASSEMBLY |

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Figure 7 Composite Headlamp Assembly

9. Composite bulb assembly to housing; secure with locking cap.
10. Battery negative (-) cable.

Headlamp Aim Adjustment

Figures 8, 9 and 10

Tools Required

- J 25300-1 Unit A - Driver-Side Aimer
- J 25300-2 Unit B - Passenger-Side Aimer
- J 25300-203 Composite Headlamp Adapters

The headlamps must be properly aimed in order to obtain the maximum road illumination and safety that have been built into the headlamp system. With composite headlamps, proper aiming is even more important because the increased range and power of these headlamps make even slight variations from recommended aiming hazardous to approaching motorists. Composite headlamps, however, do not require aiming after the bulb has been replaced.

When checking headlamp aim, the vehicle must be at normal weight (with fuel, oil, water and spare tire). Tires must be uniformly inflated to specified pressure. If the vehicle will regularly carry an unusual load in the rear compartment, or a trailer, these loads should be on the vehicle when the headlamps are checked. All states have requirements for headlamp aiming which must be followed.

The headlamp aiming equipment should be designed to accommodate all composite headlamps in any standard shape or size and in any configuration. Different light shapes and sizes are accommodated through the use of adapters as provided in the J 25300 headlamp aiming kit. Regardless of configuration, headlamps are always aimed in pairs.

The mounting and adjustment instructions are included in the J 25300 headlamp aiming kit.

1. The universal aimer should be used on a known level floor or calibrated for floor slope.
2. Select and assemble the universal adapter that fits the aiming pad pattern on the lens of the headlamp.

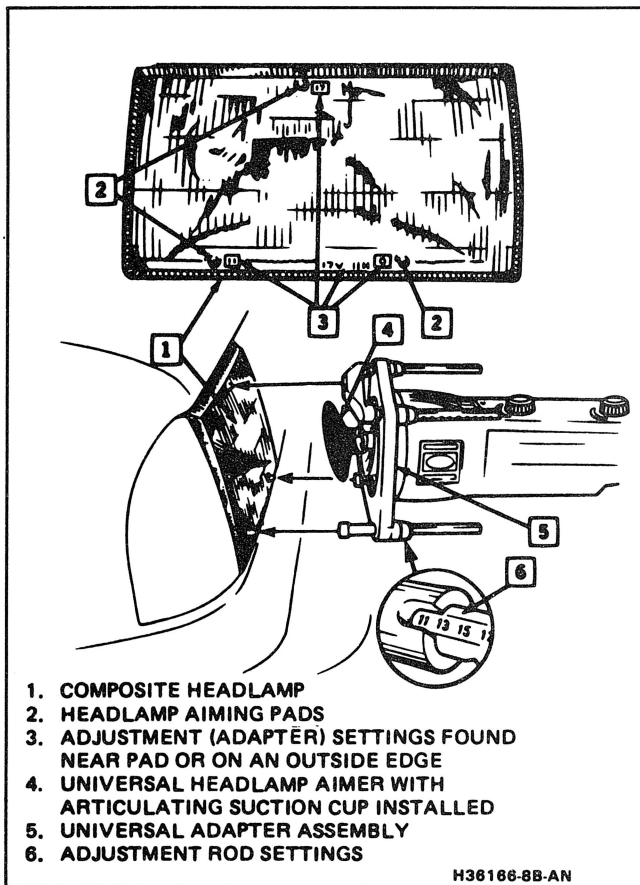


Figure 8 Composite Headlamp Aiming Mount

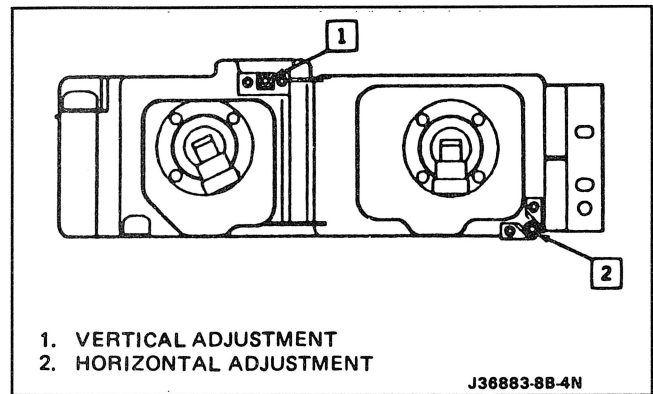


Figure 10 Headlamp Adjusters

3. Move the adjustment rods to the number that agrees with the number located on the headlamp lens.
4. Attach adapters making certain that the correct adapter is used with the correct side aimer.
5. Place the aimers with adapters onto their respective sides making sure all adjustment rods are contacting the aiming pads. It may be necessary to add or remove an extension stud.
6. Aim headlamps according to the instructions included in J 25300 headlamp aiming kit.

License Plate Lamps

Figure 2

Remove or Disconnect

1. Battery negative (-) cable.
2. Two screws securing rear combination lamp assembly to vehicle.
3. Rear combination lamp assembly by pulling assembly rearward and upward.
4. License plate socket from lamp assembly.
5. License plate lamp bulb from socket.

Install or Connect

1. License plate lamp bulb to socket.
2. Socket to lamp assembly.
3. Rear combination lamp assembly to vehicle.
4. Two screws securing rear combination lamp assembly to vehicle.
5. Battery negative (-) cable.

Rear Combination Lamp Assembly

Figure 2

Remove or Disconnect

1. Battery negative (-) cable.
2. Two screws securing rear combination lamp assembly to vehicle.
3. Rear combination lamp assembly by pulling assembly rearward and upward.
4. Lamp sockets from lamp assembly.

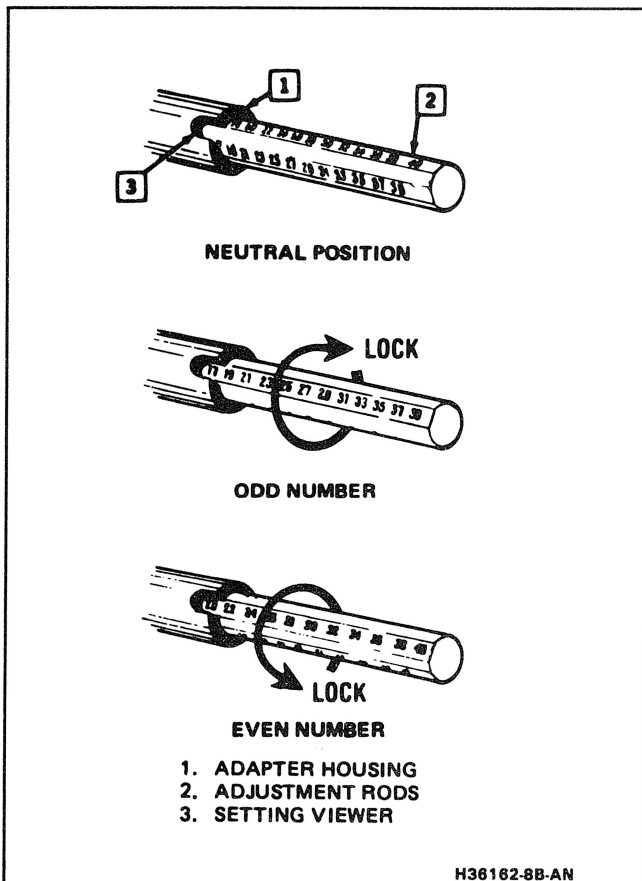


Figure 9 Headlamp Aiming Settings

5. Rear combination lamp assembly from vehicle.

Install or Connect

1. Lamp sockets to rear combination lamp assembly.
2. Rear combination lamp assembly to vehicle.
3. Two screws securing rear combination lamp assembly to vehicle.
4. Battery negative (-) cable.

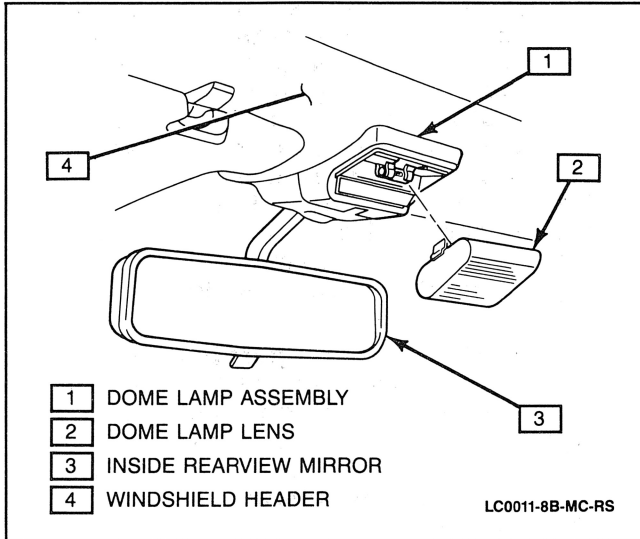


Figure 11 Dome Lamp

INTERIOR LIGHTING

Dome Lamp

Figure 11

Remove or Disconnect

1. Battery negative (-) cable.
2. Dome lamp lens by gently prying off with a screwdriver.
3. Dome lamp bulb by pulling straight out.

Install or Connect

1. Dome lamp bulb.
2. Dome lamp lens.
3. Battery negative (-) cable.

HORN

Figure 12

Remove or Disconnect

1. Battery negative (-) cable.
2. Electrical connectors from horn.
3. Mounting bolt and horn from vehicle.

Install or Connect

1. Horn to vehicle securing with mounting bolt.
2. Electrical connectors to horn.
3. Battery negative (-) cable.

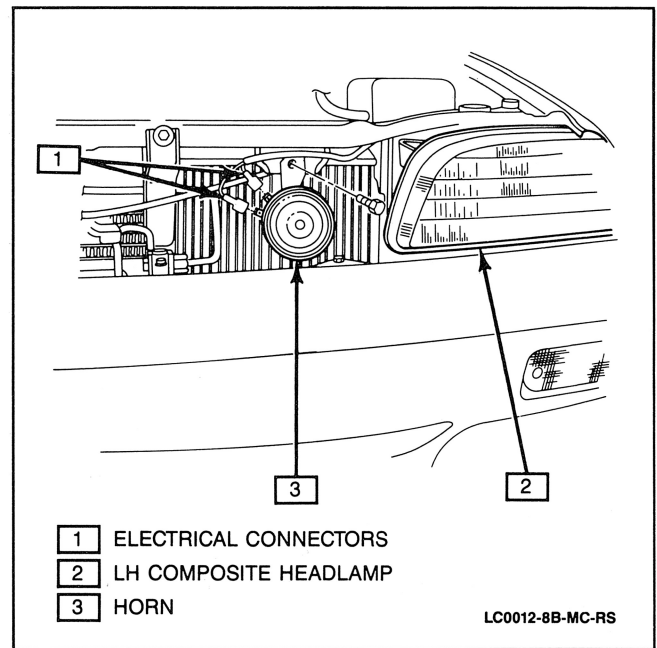


Figure 12 Horn

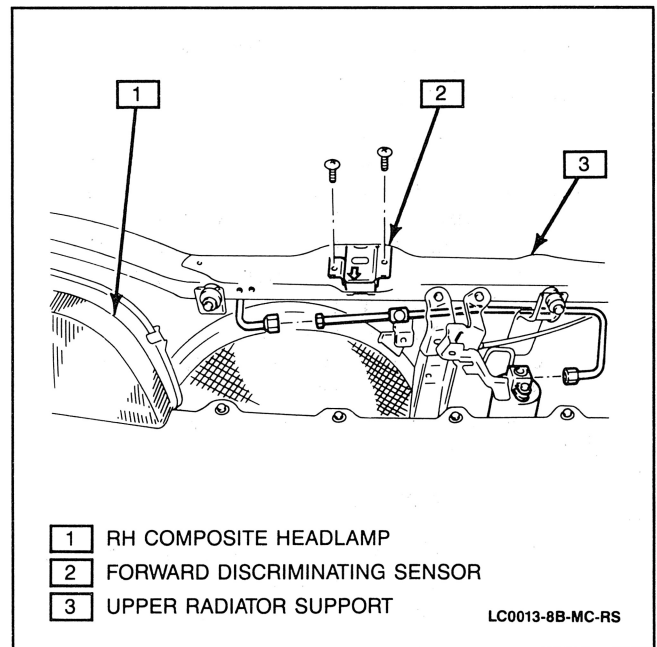


Figure 13 Forward Discriminating Sensor

FORWARD DISCRIMINATING SENSOR

Figures 13 and 14

For a description of the Supplemental Inflatable Restraint System, refer to **SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM (SEC.9J)**. For diagnosis of the Supplemental Inflatable Restraint System, refer to **SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A)**.

All sensors are specifically calibrated for each vehicle series and are keyed to the mounting brackets and the SIR wiring harness. Caution should be used to ensure proper location of the sensors to their mounting brackets. The keying of the sensors to their mounting

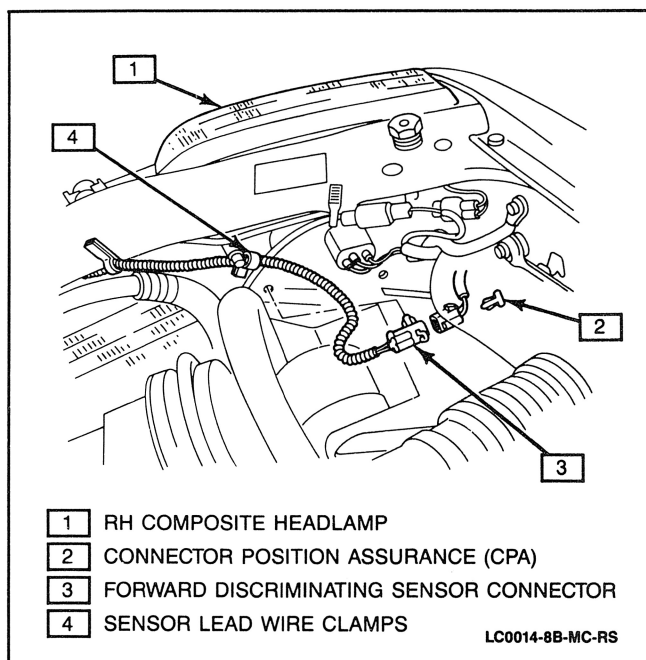


Figure 14 Forward Discriminating Sensor Connector brackets and wiring harness should never be modified in the field.

CAUTION: Be very careful when handling a sensor. Never strike or jar a sensor. If you do, it could cause deployment and result in personal injury or improper operation of the Supplemental Inflatable Restraint (SIR) System. All sensor and mounting bracket bolts must be carefully torqued to ensure proper sensor operation. Never power up the SIR system when any sensor is not rigidly attached to the vehicle since the sensor is easily activated when not attached, and could result in deployment.

Remove or Disconnect

- Disable the SIR system. Refer to “Disabling the SIR System” located under “Service Precautions” earlier in this section.

1. Battery negative (-) cable.
2. Forward discriminating sensor connector from lamp support panel.
3. Connector position assurance (CPA) and sensor connector.
4. Two sensor lead wire clamps.
5. Two bolts securing sensor to vehicle.
6. Sensor from vehicle.

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the dual sensor, forward discriminating sensor and the inflator module. Any visible damage to the sensors and/or to their respective mounting brackets requires replacement, whether a deployment occurred or not.

CAUTION: Proper operation of the forward discriminating sensor requires the sensor and its bracket be rigidly attached to the vehicle structure and that the arrow on the sensor be pointing toward the front of the vehicle.

Install or Connect

1. Sensor to vehicle; secure with 2 bolts.



Tighten

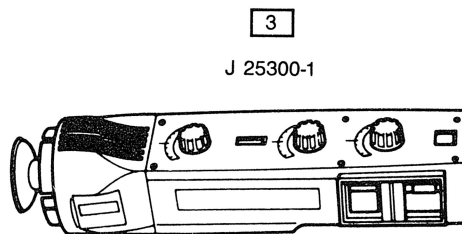
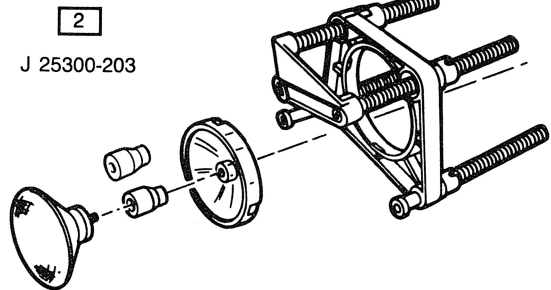
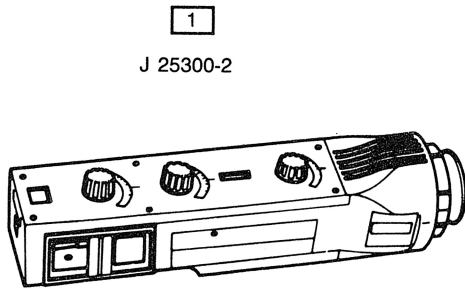
- Forward discriminating sensor mounting bolts to 11 N·m (98 lb.in.).
2. Two sensor lead wire clamps.
 3. Sensor electrical connector and CPA.
 4. Forward discriminating sensor connector to lamp support panel.
 5. Battery negative (-) cable.
 - Enable the SIR system. Refer to “Enabling the SIR System” located under “Service Precautions” earlier in this section.

SPECIFICATIONS

FASTENER TORQUES

Forward Discriminating Sensor Mounting Bolts 11 N·m (98 lb.in.)

SPECIAL TOOLS



- 1** UNIT B-PASSENGER-SIDE AIMER
- 2** COMPOSITE HEADLAMP ADAPTERS
- 3** UNIT A-DRIVER-SIDE AIMER

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SECTION 9A

RADIO

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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Clock	9A-2	Front Speakers	9A-4
		Rear Speakers	9A-4
		Antenna	9A-4

GENERAL DESCRIPTION

This vehicle may have one of two optional Delco GM Sound Systems. To listen to any system, the ignition must be in "ACC" or "ON."

NOTICE: All Delco GM Sound Systems have ungrounded speakers. Installing add-on tape players, CBs or other units which use the vehicle speakers may damage the Delco sound system or impair operation of the add-on unit.

OBTAINING BEST RECEPTION

FM Stereo

Optimal FM stereo reception is usually limited to 16 to 64 kilometers (10 to 40 miles) depending on station power, antenna height and terrain. Tall buildings, hills and other objects can cause signal flutter or noise which can be eliminated by tuning to a stronger station.

TAPE PLAYER AND CASSETTE CARE

There are two parts that should be cleaned on a tape player; the head and the capstan. Since they can be reached through the tape door, removal of the radio is unnecessary. This service should be performed every 100 hours of cassette operation.

To clean the head and capstan, use a cotton swab dipped in ordinary rubbing alcohol.

As an alternate way to clean the head and capstan, a cleaning cassette kit may be purchased. Follow instructions on the kit to clean the tape player.

Do not contact the tape head with magnetized tools. If the head becomes magnetized, every cartridge played in the player will be degraded.

No service is performed on the tapes and warranty of these tapes is handled by the cartridge manufacturer and not by the dealer. The test tape used by the dealer should be stored in its container to keep the tape clean. Store cartridges away from extreme heat or direct sunlight.

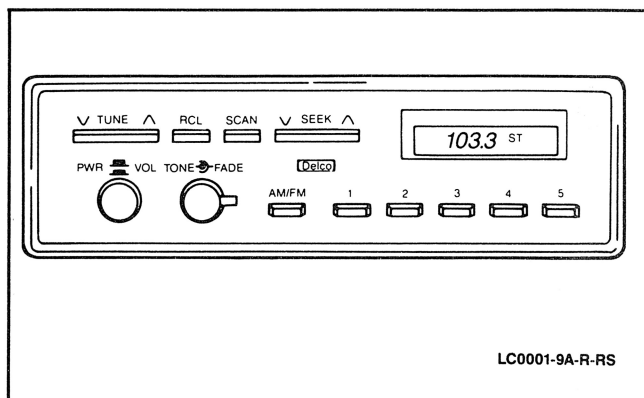


Figure 1 Delco AM/FM Stereo Radio With Clock

OPERATING INSTRUCTIONS

DELCO AM/FM STEREO RADIO WITH CLOCK

Figure 1

To Operate Radio

- **Turn Radio On**—Press the “PWR” button; press it again to turn radio off. (Radio also goes off when the ignition key is turned “OFF.”)
- **Adjust Volume**—Rotate “VOL” knob clockwise to increase volume.
- **Select AM or FM**—Press “AM/FM” button to select desired band. (“AM” or “FM” will be displayed depending on the band chosen.)
- **Seek**—Press “SEEK” button to automatically search for the next higher listenable station. Press “SEEK” to automatically search for the next lower listenable station.
- **Manual Tuning**—Press and hold “TUNE” to manually tune up the radio dial. Press and hold “TUNE” to manually tune down the radio dial. Release the button when the desired station is reached.
- **Station Preset Push Buttons**—There are five push buttons numbered 1 through 5. They help you return to a preset station. Set the push button as follows:
 1. Tune in the station.
 2. Press and hold one of the push buttons for more than 2 seconds.

The station is now preset to that push button. The radio will now return to the stored frequency whenever that push button is depressed. A total of ten stations can be preset (five AM and five FM).
- **Scan**—Press “SCAN” to sample each station for 5 seconds; press again to hold at a desired station.
- **Tone**—Rotate the “TONE” control clockwise to increase treble; counterclockwise rotation favors the bass.
- **Speaker Adjustment**—Turn the “FADE” control (located behind the “TONE” knob) clockwise to favor the rear speakers. A detent indicates the center of rotation.

- **Recall**—Press “RCL” to switch between time and frequency on the display.
- **Display Priority**—Press “RCL” and “SEEK” to change display priority from time to frequency. Repeat to change back.

To Set the Clock

- Press “RCL” and hold.
- Press “SEEK” (up) to change minutes.
- Press “SEEK” (down) to change hours.

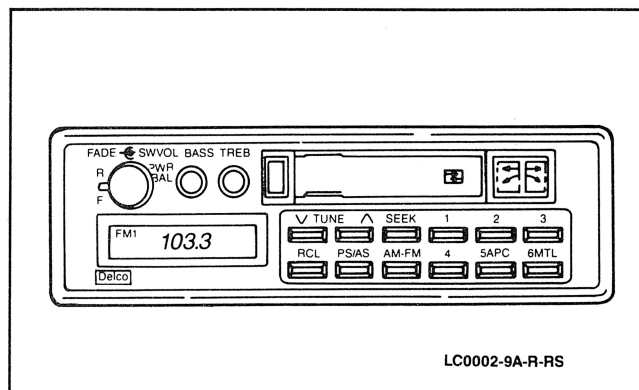


Figure 2 Delco AM/FM Stereo Radio, Cassette and Clock

DELCO AM/FM STEREO RADIO, CASSETTE AND CLOCK

Figure 2

To Operate Radio

- **Turn Radio On**—Press the “PWR” button; press it again to turn radio off. (Radio also goes off when the ignition key is turned “OFF.”)
- **Adjust Volume**—Rotate “VOL” knob clockwise to increase volume.
- **Select AM or FM**—Press “AM/FM” button to select desired band. (“AM” or “FM1” or “FM2” will be displayed depending on the band chosen.)
- **Seek**—Press “SEEK” button to automatically search for the next higher listenable station.
- **Preset Scan**—Press the “PS/AS” button (for less than 2 seconds) to activate the preset scan function. In this mode, the tuner scans and pauses for 5 seconds on each of the preset push button frequencies. Press the “PS/AS” button again to cancel the preset scan function.
- **Auto Store**—Press the “PS/AS” button (for more than 2 seconds) to activate the auto store function. In this mode, the tuner automatically scans and stores the first 6 strongest stations on preset push buttons “1” through “6.”
- **Manual Tuning**—Press and hold “TUNE” to manually tune up the radio dial. Press and hold “TUNE” to manually tune up and down the radio dial. Release the button when the desired station is reached.
- **Station Preset Push Buttons**—There are six push buttons numbered “1” through “6.” They allow you to return to a preset station. Set the push button as follows:

1. Tune in the station.
2. Press one of the 6 push buttons until music is heard again.

The station is now preset to that push button. The radio will now return to the stored frequency whenever that push button is depressed. A total of 18 stations can be preset (6 AM and 12 FM).

- **Bass**—Press the “BASS” knob to pop it out for adjustment. Rotate the “BASS” knob counterclockwise to decrease bass. Rotate it clockwise to increase bass. The “BASS” knob can be set at the center detent position for a balanced bass sound. Press the “BASS” knob in to store.
- **Treble**—Press the “TREB” knob to pop it out for adjustment. Rotate the “TREB” knob counterclockwise to decrease treble. Rotate it clockwise to increase treble. The “TREB” knob can be set at the center detent position for a balanced treble sound. Press the “TREB” knob in to store.
- **Speaker Front/Rear Fade**—Rotate the “FADE” knob counterclockwise to increase volume in the front speakers. The “FADE” knob can be set at the center detent position for a balanced sound between the front and rear speakers.
- **Speaker Balance**—Pull the “VOL” knob out to its detent position. Rotate the balance control clockwise to favor the right speakers; counterclockwise to favor the left speakers. A detent position at the center of the control range equalizes volume between the right and left speakers. When balance setting is complete, press the knob to return to the volume control position.
- **Recall**—Press “RCL” to switch between time and frequency on the display.
- **Display Priority**—Press “RCL” and “SEEK” to change display priority from time to frequency. Repeat to change back.

To Operate Cassette Tape Player

- **Inserting Cassette Tape**—Insert tape into the door marked “AUTOMATIC PROGRAM CONTROL.” Raised portions of cassette cartridge should be to the right. When cartridge is inserted, an arrow will appear in the display. If the arrow points to the left, the selections on the top side are playing. If the arrow points to the right, the selections on the bottom side are playing. The tape will automatically change directions when the end of one side has been reached.
- **To Play Other Side of Tape**—Press the “PRO” button; observe the direction arrow change in the display.
- **Fast Forward**—Viewing the arrow in the display, press the button with the arrow pointing in the same direction to initiate fast forward. Press the button with the arrow pointing in the opposite direction lightly to return to normal tape speed.

- **Fast Reverse**—Viewing the arrow in the display, press the button with the arrow pointing in the opposite direction to activate fast reverse. Press the other button lightly to return to normal tape speed and direction.
- **Automatic Program Control (APC)**—Press the “APC” button. With “APC” appearing in the display, the tape forward/reverse buttons now cause the tape mechanism to automatically find the beginning of the next or the previous selection.
- **Tape Bias**—Tape bias is set by depressing the “MTL” button for CrO₂ or metal tapes.
- **To Eject a Tape**—Press both the tape forward/reverse buttons firmly and simultaneously to eject the tape. It is not necessary to eject the tape when the ignition switch is turned to “OFF.”

To Set the Clock

- Press “RCL” and hold.
- Press “TUNE” (up) to change minutes.
- Press “TUNE” (down) to change hours.

DIAGNOSIS

For system diagnosis and radio circuit operation, refer to the 1990 Geo Metro Electrical Diagnosis Service Manual Supplement.

ON-VEHICLE SERVICE

RADIO

Figure 3

Remove or Disconnect

1. Battery negative (-) cable.
- Open glove box.
2. One screw and glove box upper panel.
3. One screw securing radio to mounting bracket. Access through glove box opening.
- Push radio out of instrument panel.
4. Electrical connector and antenna lead.
5. Radio from vehicle.

Install or Connect

1. Radio to vehicle, connecting antenna lead and electrical connector.
- Push radio into instrument panel, engaging retaining clips.
2. One screw securing radio to mounting bracket. Access through glove box opening.
3. Glove box upper panel; secure with 1 screw.
- Close glove box.
4. Battery negative (-) cable.

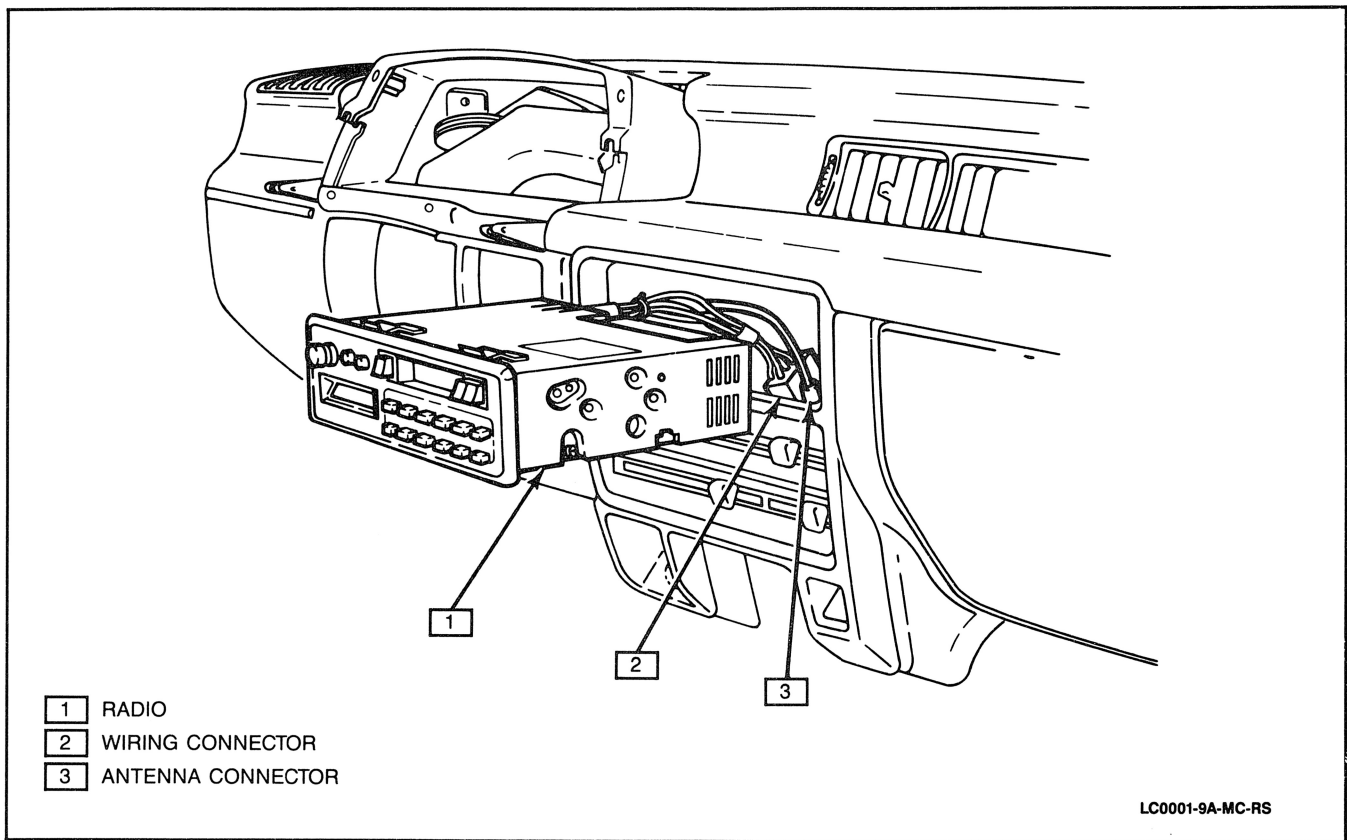


Figure 3 Radio Mounting

SPEAKERS

Front Speakers

Remove or Disconnect

1. Battery negative (-) cable.
2. Instrument panel speaker cover by lifting two fasteners with small screwdriver.
3. Two screws retaining speaker.
4. Speaker from instrument panel, disconnecting electrical lead.

Install or Connect

1. Speaker electrical lead.
2. Speaker to vehicle; secure with 2 screws.
3. Speaker cover to instrument panel.
4. Battery negative (-) cable.

Rear Speakers

Remove or Disconnect

1. Battery negative (-) cable.
2. Rear speaker trim panel. Refer to REAR QUARTERS (SEC.10-7).
3. Screws securing speaker.
4. Electrical leads from speaker and remove speaker from vehicle.

Install or Connect

1. Speaker assembly to vehicle, connecting electrical leads.
2. Screws securing speaker assembly to vehicle.
3. Rear speaker trim panel. Refer to REAR QUARTERS (SEC.10-7).
4. Battery negative (-) cable.

ANTENNA

Figure 4

Remove or Disconnect

1. Screws, clips, and fender wheel housing.
2. Antenna rod from ground base.
3. Antenna ground base mounting nut and insulator.
4. Antenna connector located behind wheel housing.
5. Antenna ground base assembly.

Install or Connect

1. Antenna ground base assembly to fender.
2. Insulator and ground base nut.
3. Antenna connector.
4. Wheel housing, screws, and clips.
5. Antenna rod into ground base.

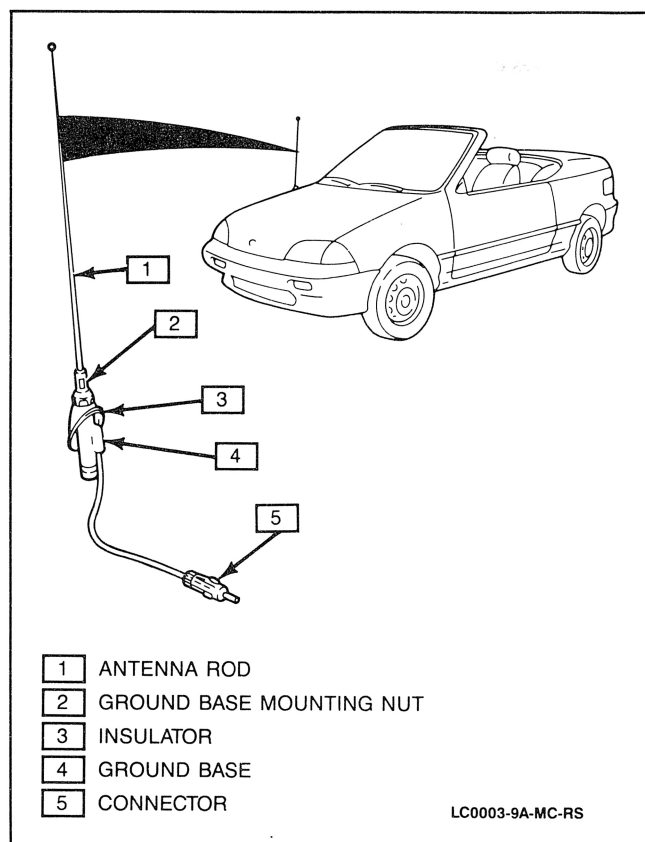


Figure 4 Antenna Assembly

SECTION 9J

SUPPLEMENTAL INFLATABLE RESTRAINT (SIR) SYSTEM

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

CAUTION: On vehicles equipped with Supplemental Inflatable Restraints (SIR), refer to **CAUTIONS** under On-Vehicle Service when performing service on or around SIR components or SIR wiring. Failure to follow cautions could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

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System Description	9J-1	Removal and Installation Procedures ..	9J-9
Component Description	9J-2	Wiring Repair	9J-9
Definitions	9J-6	Connector Terms	9J-12
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INTRODUCTION

GENERAL DESCRIPTION

The Supplemental Inflatable Restraint (SIR) System supplements the normal restraint of the driver's seat belt by deploying an air bag from the center of the steering wheel during an accident. The SIR system is designed to work in conjunction with the seat belt system. The air bag deploys when the vehicle is involved in a front end collision of sufficient force. To further absorb the energy of an accident there is a knee bolster located beneath the instrument panel in the driver's area. The steering column continues to be collapsible.

SYSTEM DESCRIPTION

Electrical System

Figure 9J-2

The main portions of the SIR system are the Deployment Loop and the Diagnostic Energy Reserve Module (DERM). The main function of the deployment loop is to supply current through the Inflator Module in the steering wheel will cause deployment of the air bag in the event of an accident serve enough to warrant deployment.

The Arming Sensor, SIR Coil, Inflator Module and Discriminating Sensors make up the deployment loop. The Arming Sensor switches power to the Inflator Module on the high side of the deployment loop. Either of the Discriminating Sensors can supply ground to the Inflator Module on the low side of the loop. The inflator module is only supplied sufficient current to deploy when the Arming Sensor and at least one of the two Discriminating Sensors close simultaneously.

The function of the Diagnostic Energy Reserve Module (DERM) is to supply the deployment loop with a 36 Volt Loop Reserve (36 VLR) to assure sufficient energy to deploy the air bag for a few seconds after ignition voltage is lost in an accident. Deployment of the air bag can still take place without the DERM connected if adequate ignition voltage is present at the Arming Sensor.

Another function of the DERM is electrical system diagnostics. The DERM is utilized in conjunction with the resistors in the Arming Sensor, Discriminating Sensors and Resistor Module. These resistors make it possible for the DERM to detect circuit and component faults within the deployment loop. The DERM monitors the voltage drop across each component within the loop during normal non-deployment conditions. If the monitored voltages fall outside of expected limits, the DERM will indicate a fault through the storage of a malfunction code and the illumination of the "INFLATABLE RESTRAINT" indicator lamp.

9J-2 SIR DIAGNOSIS

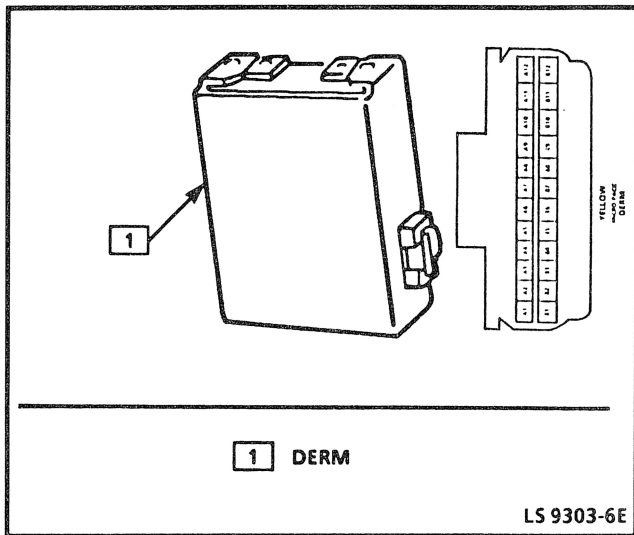


Figure 9J-1 - Diagnostic Energy Reserve Module (DERM)

COMPONENT DESCRIPTION

Figure 9J-1

DERM:

The DERM (Diagnostic Energy Reserve Module) is designed to perform the following functions in the SIR system:

1. **Energy Reserve;** The DERM maintains a 36 Volt Loop Reserve (36 VLR) energy supply to provide deployment energy for a few seconds when the vehicle voltage is low or if a lost in a vehicle accident.
2. **Malfunction Detection;** The DERM performs diagnostic monitoring of SIR system, electrical components.
3. **Malfunction Recording;** The DERM provides SIR System fault code information through a Tech 1 or the "INFLATABLE RESTRAINT" indicator light.
4. **Driver Notification;** The DERM warns the vehicle driver of SIR system faults by controlling the "INFLATABLE RESTRAINT" indicator lamp.
5. **Accident Recording;** The DERM records the SIR system status during a vehicle accident.

The DERM is connected to the SIR harness by a 24 way connector. This harness connector utilizes a shorting bar across certain terminals in the contact area. This shorting bar connects the "INFLATABLE RESTRAINT" indicator input to ground when the DERM connector is disconnected. This will cause the "INFLATABLE RESTRAINT" indicator to come on steady whenever the ignition switch is at the RUN, BULB TEST or START positions with the DERM disconnected.

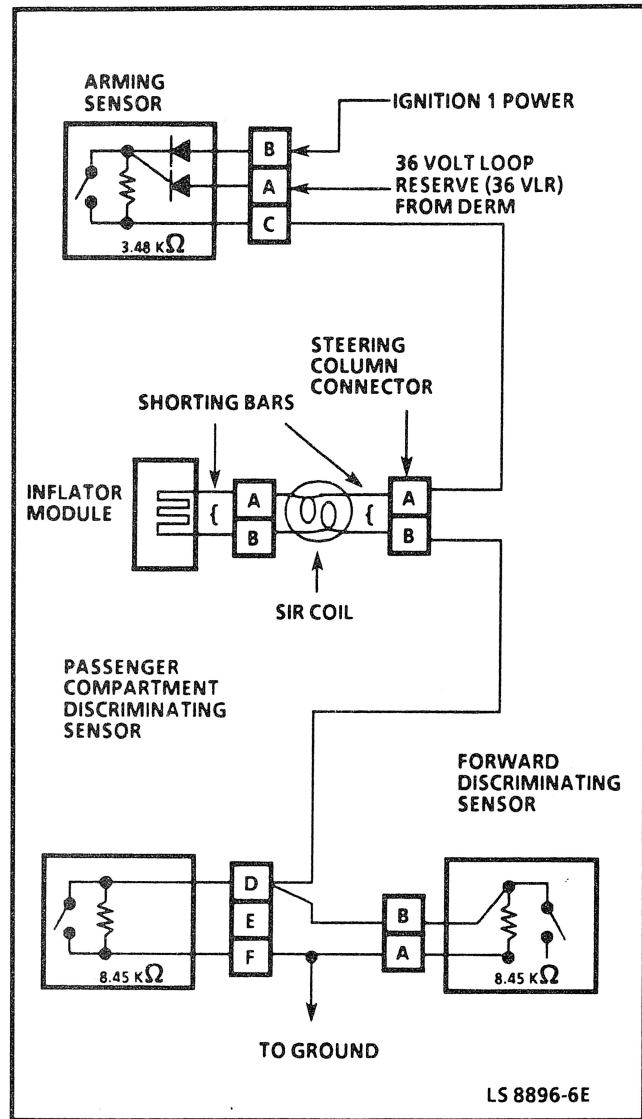


Figure 9J-2 - Deployment Loop

"Inflatable Restraint" Indicator:

Battery voltage is applied to the "INFLATABLE RESTRAINT" indicator lamp when the Ignition Switch is at the RUN, BULB TEST or START positions. The DERM controls the lamp by providing ground with a lamp driver. The "INFLATABLE RESTRAINT" indicator lamp is used in the SIR system to do the following:

1. Verify lamp and DERM operation by flashing 7 times when the ignition switch is first turned "ON."
2. Warn the vehicle driver of SIR electrical system faults which could potentially affect the operation of the SIR system.
3. Provide diagnostic information by flashing the fault codes when the flash code diagnostic mode is enabled.

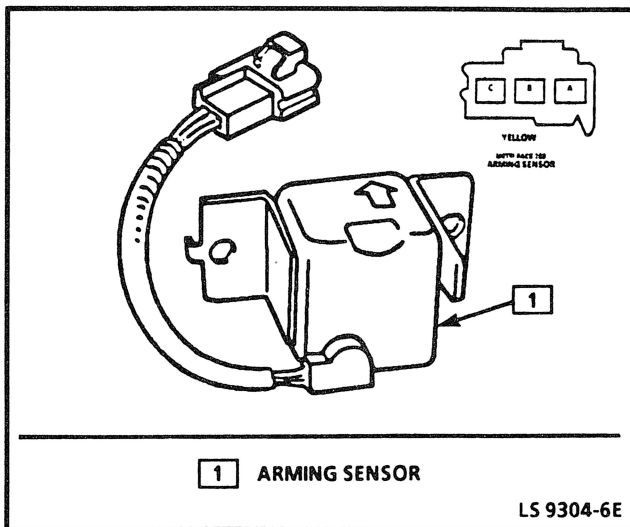


Figure 9J-3 - Arming

The "INFLATABLE RESTRAINT" indicator lamp is the key to driver notification of SIR system faults. Proper lamp operation is verified by the "SIR Diagnostic System Check" in this section.

Arming Sensor: Figure 9J-3

The Arming Sensor is a protective switch located in the power feed side (or high side) of the deployment loop. The Arming Sensor is calibrated to close at low level velocity changes (lower than the Discriminating Sensors). This assures that the Inflator Module is connected directly to the 36VLR output of the DERM or Ignition 1 voltage when either of the Discriminating Sensors closes.

The Arming Sensor consists of a sensing element, normally open switch contacts, a diagnostic resistor and two steering diodes. The sensing element closes the normally open switch contacts when the velocity of the vehicle changes at a rate indicating potential need for deployment.

The diagnostic resistor is connected in parallel with the normally open switch contacts and allows a small amount of current through the deployment loop during normal non-deployment conditions. This small current flow results in voltage drops across each component within the loop. The DERM monitors these voltage drops to detect circuit or component faults. The two steering diodes provide isolation between the 36VLR output of the DERM and Ignition 1 voltage.

Discriminating Sensors: Figure 9J-4

There are two Discriminating Sensors in the SIR system. The Forward Discriminating Sensor is located in front of the radiator and the Passenger Compartment Discriminating Sensor is located in passenger compartment behind the dash assembly right of center at the cowl.

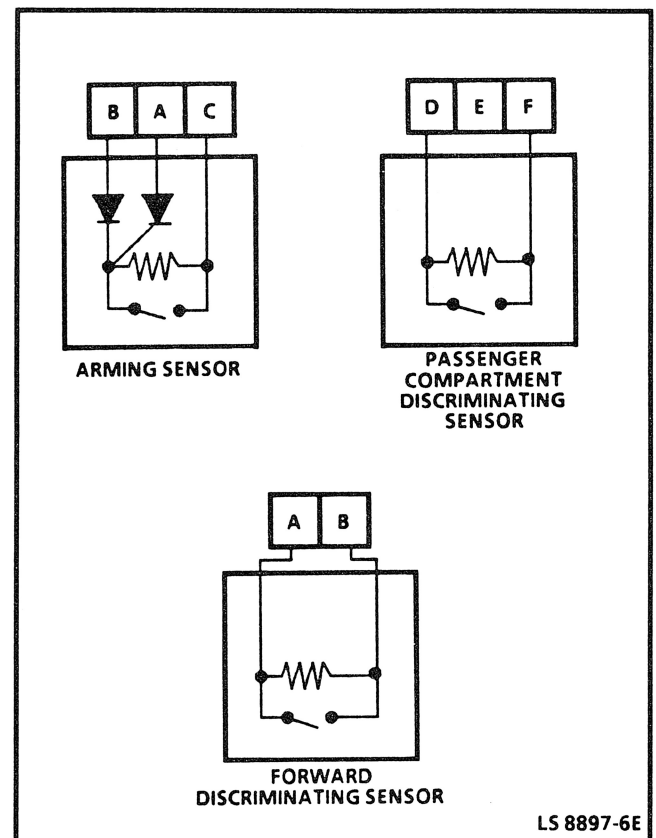


Figure 9J-4 - Discriminating Sensors

The Discriminating Sensors are wired in parallel on the ground side (or low side) of the deployment loop. These sensors are calibrated to close with velocity changes which are severe enough to warrant deployment.

The Discriminating Sensors consist of a sensing element, normally open switch contacts and a diagnostic resistor. The sensing element closes the normally open switch contacts when the vehicle velocity changes are severe enough to warrant deployment.

A diagnostic resistor is connected in parallel with the normally open switch contacts within each of the Discriminating Sensors. These parallel resistors supply the ground path for the current passing through the deployment loop during normal non-deployment conditions. This small current flow results in voltage drops across each component within the loop. The DERM monitors these voltage drops to detect circuit or component faults.

Sir Coil: Figure 9J-5

The SIR Coil consists of two current carrying coils. They are attached to the steering column and allow rotation of the steering wheel while maintaining continuous contact of the deployment loop through the Inflator Module.

9J-4 SIR DIAGNOSIS

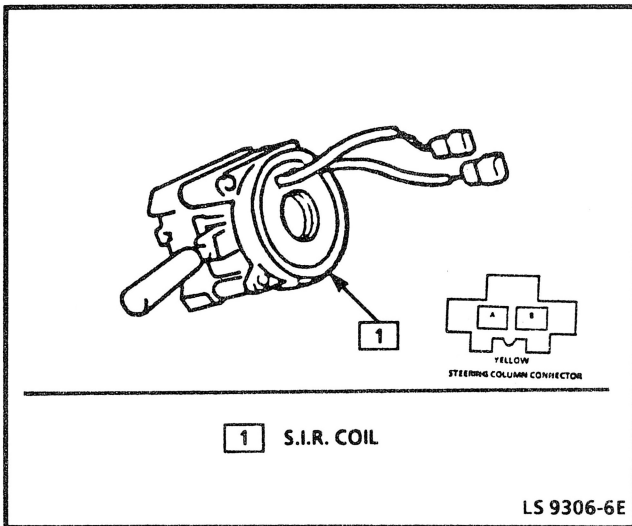


Figure 9J-5 - S.I.R. Coil Assembly

There is shorting bar on the lower steering column connector which connects the SIR Coil to the SIR harness. The shorting bar shorts the circuits to the main coil and Inflator Module when the lower steering column connector is disconnected. The circuit to the Inflator Module is shorted in this way to help prevent unwanted deployment of the air bag when servicing the steering column or other SIR components.

Inflator Module: Figure 9J-6

The Inflator Module is located on the steering wheel. The Inflator Module consists of: an inflatable bag, inflator and initiator (a canister of gas-generating material and initiating device). When the vehicle is in an accident of sufficient force to close the Arming Sensor and at least one of the Discriminating Sensors simultaneously, current is developed through the deployment loop. Current passing through the initiator thus ignites the material in the Inflator Module. The gas produced from this reaction rapidly inflates the air bag.

There is a shorting bar on the Inflator Module side of the upper steering column connector which connects the SIR Coil to the Inflator Module. The shorting bar shorts the Inflator Module circuit when the SIR Coil connector is disconnected. The circuit to the Inflator Module is shorted in this way to help prevent unwanted deployment of the air bag when servicing the Inflator Module or steering column.

Resistor Module: Figure 9J-7

The Resistor Module is inserted in the SIR harness between the Inflator Module and the DERM. The Resistor Module allows the DERM to monitor the deployment loop for faults and also allows the DERM to detect when a deployment has occurred.

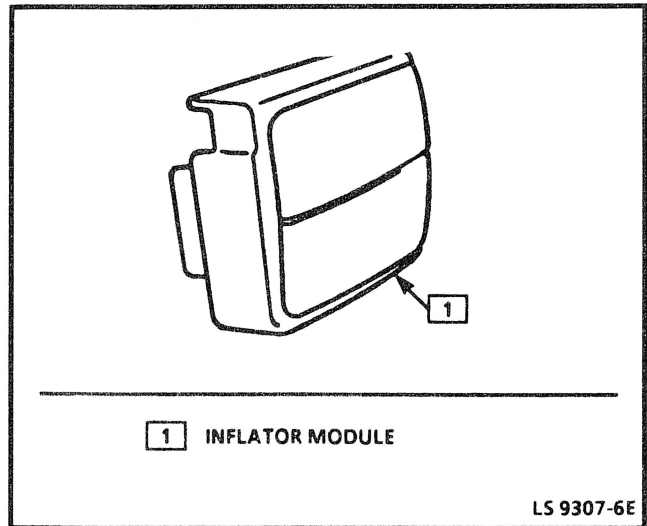


Figure 9J-6 - Inflator Module

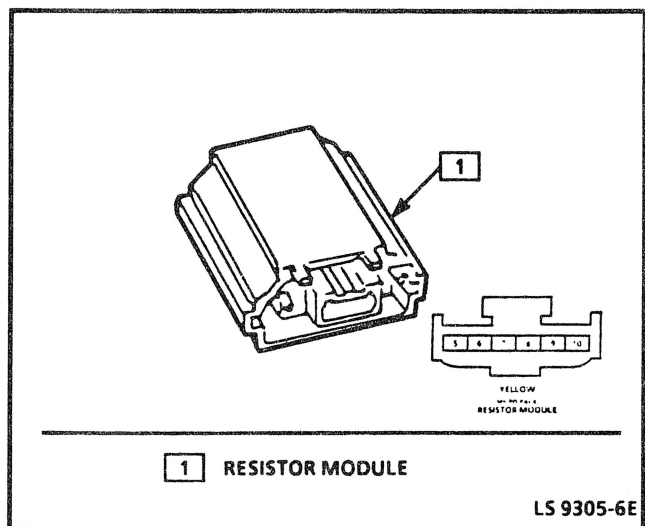


Figure 9J-7 - Resistor Module

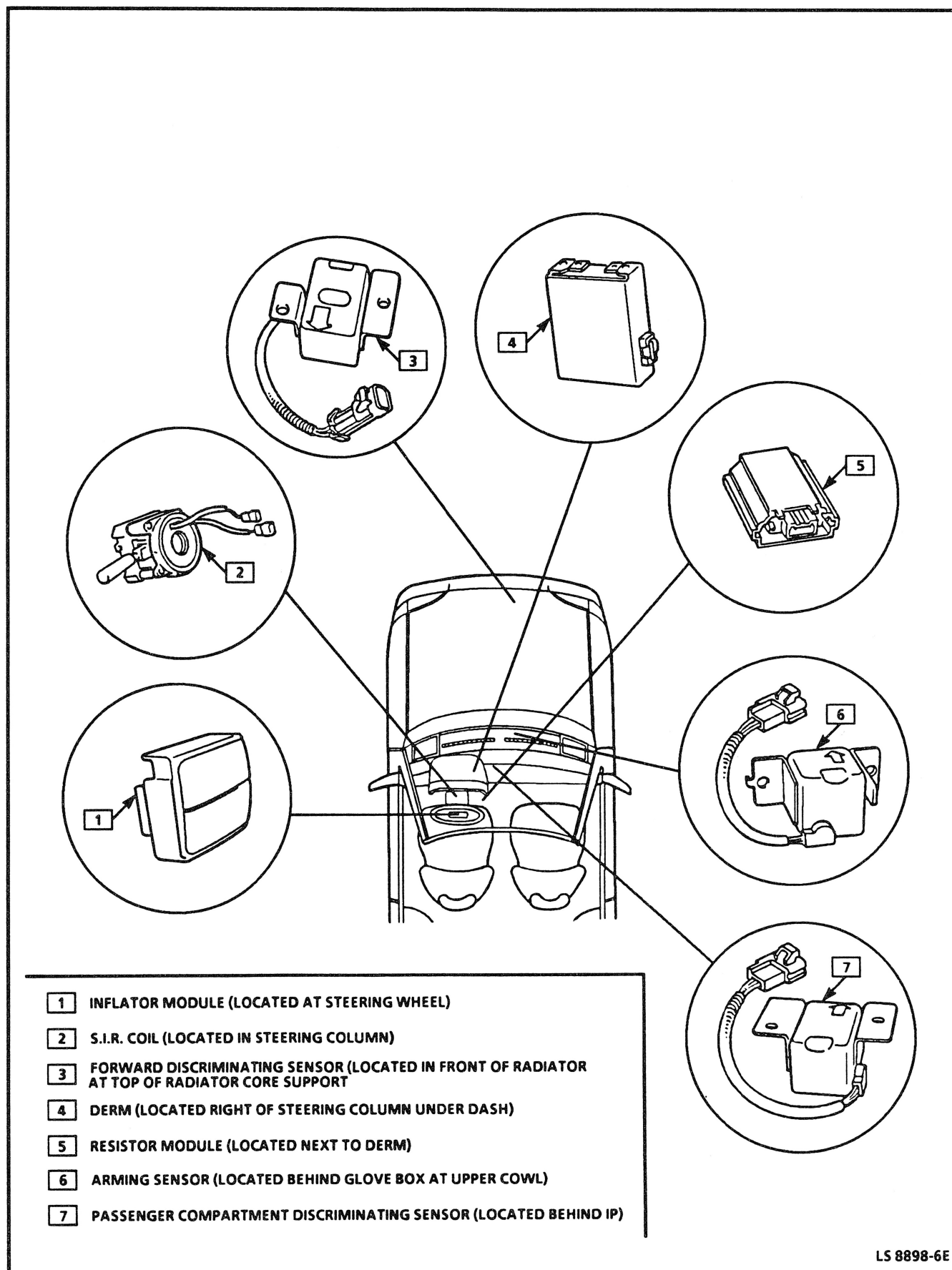
The resistors in the Resistor Module are balanced with the resistors in the Arming and Discriminating Sensors to allow the DERM to monitor the voltage drops across the components of the deployment loop. Faults are detected during normal non-deployment conditions by monitoring these voltages.

Steering column: Figure 9J-8

The steering column is energy absorbing and is designed to compress in a front-end collisions to lessen the chance of injury to the driver. A steering column reinforcement is also used for additional support.

Knee Bolster: Figure 9J-9

The knee bolster is used to absorb energy and control the driver's forward movement during a crash by limiting leg movement.



LS 8898-6E

Figure 9J-8 - SIR Compartment Location Guide

9J-6 SIR DIAGNOSIS

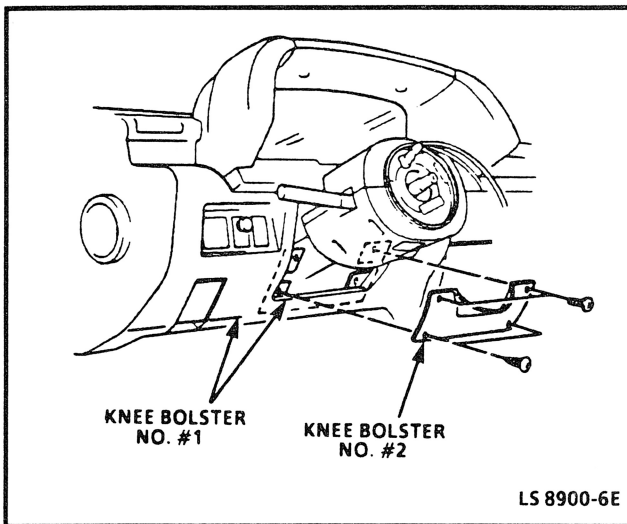


Figure 9J-9 - Knee Bolster and Steering Column

DEFINITIONS:

ALDL - Assembly Line Data Link.

ARMING SENSOR - A Sensor on the High side (or power side) of the deployment loop that is calibrated to supply voltage to the Inflator Module when the vehicle velocity changes are severe enough to warrant arming of the air bag.

"CONTINUOUS MONITORING" - Tests performed by the DERM on the SIR system every 100 milliseconds while Ignition 1 voltage is present at the DERM.

DATA LINK - A signal wire used for communications between multiple ON-board computers or from an on-board computer to an OFF-board computer.

DEPLOY - To inflate the bag located in the trim cover of the steering wheel.

DEPLOYMENT LOOP - The circuit that supplies current to the Inflator Module in the steering wheel to deploy the air bag.

DERM - Diagnostic Energy Reserve Module which provides reserve energy to the deployment loop and diagnostic monitoring of all system components.

FORWARD DISCRIMINATING SENSOR - A sensor on the ground side (or low side) of the deployment loop that is calibrated to ground the Inflator Module when the vehicle velocity changes are severe enough to warrant deployment of the air bag.

EEPROM - Electrically Erasable Programmable Read Only Memory.

FORCE HI - An output of the DERM which injects current into the steering column circuit during the "Steering Column Resistance" tests.

FORCE LOW - An input of the DERM which grounds the steering column circuit during the "Steering Column Resistance" tests.

INFLATOR MODULE - An assembly located in the steering wheel hub beneath the vinyl trim cover consisting of an inflatable bag and the Inflator.

NSSS - Neutral Start Safety Switch, switch to disable starter motor activation when the vehicle is not in Park or Neutral.

PASSENGER COMPARTMENT DISCRIMINATING SENSOR - A Sensor on the ground side (or low side) of the deployment loop that is calibrated to ground the Inflator Module when the vehicle velocity changes are severe enough to warrant deployment of the air bag.

RESISTOR MODULE - An assembly of resistors in the SIR harness between the DERM and steering wheel which allows the DERM to monitor the deployment loop for faults and detect when a vehicle accident has occurred.

Tech 1 - Tool used to read diagnostic information from the DERM via the ALDL connector.

SENSE HI - An input to the DERM on the high side of the deployment loop which the DERM monitors for fault detection.

SENSE LOW - An input to the DERM on the low side of the deployment loop which the DERM monitors for fault detection.

SIR - Supplemental Inflatable Restraint.

SIR COIL - A current carrying coil in the deployment loop that allows the rotation of the steering wheel while maintaining the continuous contact of the deployment loop through the Inflator Module.

WIRING HARNESS - The wires and connectors that electrically connect the components in the SIR system together.

"STEERING COLUMN RESISTANCE" - Inflator Module, SIR Coil and steering column wiring tests, which the DERM performs once each ignition cycle when no faults are detected during "Turn-ON" or "Continuous Monitoring."

SYSTEM VOLTAGE - Voltage available at the battery at the time of the indicated voltage measurement. With the key "ON" and engine not running, the system voltage will likely be between 12 and 12.5 volts. At idle the voltage may be 14 to 16 volts. The voltage could be as low as 10 volts during engine cranking.

"TURN-ON" - Tests which the DERM performs on the SIR system once during each ignition cycle immediately after Ignition 1 voltage is applied to the DERM.

36VLR - The 36 Volt Loop Reserve energy supply from the DERM which provides deployment power when vehicle voltage is low or is lost in an accident.

ON-VEHICLE SERVICE

SERVICE PRECAUTIONS

General Safety Procedures

The DERM can maintain sufficient voltage to cause a deployment for up to 10 minutes after the Ignition Switch is turned "OFF" and the battery is disconnected. Many of the service procedures require disconnection of the Inflator Module from the deployment loop to avoid an accidental deployment. The following procedure will disable the SIR system.

1. Turn ignition switch "OFF."
2. Disconnect Negative Battery Cable.
3. Remove the CPA (connector positive assurance) lock on the yellow 2-way connector at the back of the steering wheel.
4. Disconnect the yellow 2-way connector at the back of the steering wheel.

When all service work is completed, the following procedure should be followed:

1. Connect the yellow 2-way connector at the back of the steering wheel.
2. Install the CPA (connector positive assurance) lock on the yellow 2-way connector at the back of the steering wheel.
3. Connect negative battery cable.
4. Turn ignition switch to "ON" and make sure the "INFLATABLE RESTRAINT" light flashes 7 times and then goes out. If the light does not operate as indicated, refer to "SIR DIAGNOSTIC SYSTEM CHECK" in Section "9J-A".

SENSORS

All sensors are specifically calibrated to each vehicle series and are keyed to the mounting brackets and the SIR wiring harness.

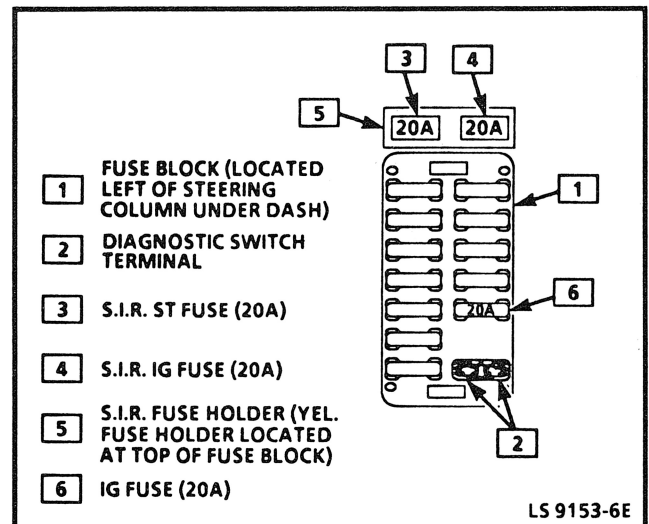


Figure 9J-10 - Fuse Block

Caution should be used to assure proper location of the sensors to their mounting brackets. The keying of the sensors to their mounting brackets and wiring harness should never be modified in the field. Refer to Section "9J-B" for Forward Discriminating Sensor, Passenger Discriminating Sensor and Arming Sensor removal and replacement procedures.

CAUTION: Be very careful when handling a sensor. Never strike or jar a sensor. If you do, it could cause deployment and result in personal injury or improper operation of the Supplemental Inflatable Restraint (SIR) System. All sensors and mounting bracket bolts must be carefully torqued to assure proper sensor operation. Never power up the SIR system when any sensor is not rigidly attached to vehicle, since the sensor is easily activated when not attached and could result in deployment.

INFLATOR MODULE Figure 9J-10

Live (Undeployed) Inflator Modules

Special care is necessary when handling and storing a live (undeployed) Inflator Module. The rapid gas generation produced during deployment of the air bag could cause the Inflator Module, or object in front of the Inflator Module, to be thrown through the air in the unlikely event of an accidental deployment.

CAUTION: When carrying a live Inflator Module, make sure the bag and trim cover are pointed away from you. In case of an accidental deployment, the bag will then deploy with minimal chance of injury. When placing a live Inflator Module on a bench or

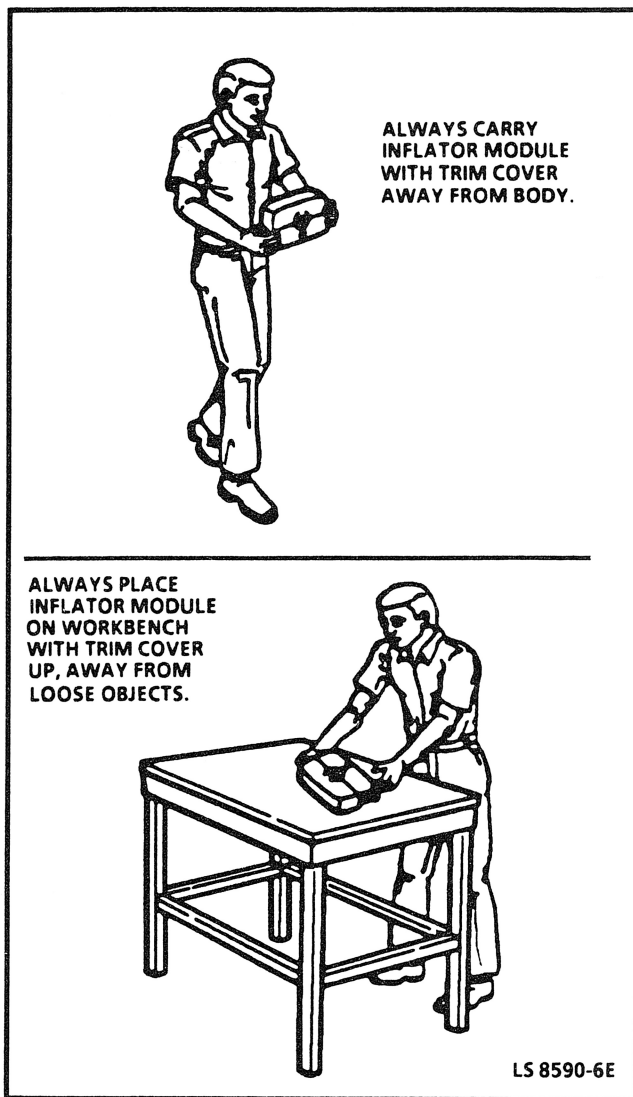


Figure 9J-11 - Proper Live Inflator Module Handling

other surface, always face the bag and trim cover up, away from the surface. This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment. Otherwise, personal injury may result. Also, never carry the Inflator Module by the wires or connector on the underside of the module.

Inflator Module Scrapping Procedures

CAUTION: Failure to follow proper SIR inflator module disposal procedures can result in air bag deployment which may cause personal injury. Undeployed inflator modules must not be disposed of through normal refuse channels. The undeployed inflator module contains substances that can cause severe illness or personal injury if the sealed container is damaged during disposal. Disposal in any manner inconsistent with proper procedures may be a violation of federal, state and/or local laws.

Chevrolet dealers should refer to the latest Chevrolet Service Bulletins for proper SIR Inflator Module disposal procedures. All others should contact a local Chevrolet dealership for proper SIR Inflator Module disposal procedures.

Vehicle Scrapping Procedures

Some vehicles equipped with SIR systems that have live (undeployed) Inflator Modules may have to be scrapped because they have completed their useful life or have been severely damaged in a nondeployment type accident. The following procedure should be followed when scrapping a vehicle with an undeployed module.

1. Turn ignition switch "OFF."
2. Disconnect the yellow 2-way connector at the base of the steering column.
3. Cut the harness side of the SIR wiring approximately 3 to 6 inches from the yellow 2-way connector.
4. Splice 2 wires at least 20 feet long to the wiring attached to the yellow 2-way that was cut from the SIR harness wiring in step 3.

5. Connect the yellow 2-way connector with 20 foot wires attached to yellow 3-way SIR connector at the base of the steering column.
6. Check the Inflator Module is secured to the steering wheel.
7. Remove all loose objects from the front seat.
8. Be sure no one is in the vehicle.
9. Stretch wires away from car to their full length.
10. To deploy air bag connect one wire to a 12 volt source and the other to ground.
11. Do not touch Inflator Module area for 20 minutes, due to heat generated during deployment.
12. Wear gloves and safety glasses if you handle the deployed air bag. Wash your hands with mild soap and water afterwards.

Deployed Inflator Modules

After an Inflator Module has been deployed, the surface of the air bag may contain a small amount of sodium hydroxide dust (a by-product of the reaction which takes place during deployment) combined with a white packing powder (used to ease deployment of the bag). The sodium hydroxide dust could be irritating to the skin if left on for an extended period of time.

CAUTION: Safety precautions must be observed when handling a deployed Inflator Module. After deployment, the air bag surface may contain deposits of sodium hydroxide dust, a by-product of the sodium azide reaction during deployment that is irritating to the skin. Always wear gloves and safety glasses when handling a deployed Inflator Module, and wash you hands with mild soap and water afterwards.

INSPECTIONS REQUIRED AFTER AN ACCIDENT



Important

- All SIR system components, including harness and brackets, must be inspected after an accident. If any are damaged or bent, they must be replaced **even if a deployment did not occur**. Inspect steering column (see Steering Column Unit Repair), knee bolster, for damage. Do not attempt to service the **forward discriminating sensor, passenger compartment discriminating sensor, arming sensor, DERM, SIR coil or inflator module**. Service is by replacement only with the crimp and seal splice sleeves contained within tool J 38125. The pigtail portion of the Arming Sensor, Forward Discriminating Sensor, Passenger Compartment Discriminating and SIR coil should not be repaired.

If damaged, replace assembly complete.

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the arming sensor, forward discriminating sensor, passenger compartment discriminating and the inflator module. Any visible damage to the sensors and/or their respective mounting brackets and/or wiring requires replacement, whether a deployment occurred or not.

REMOVAL AND INSTALLATION PROCEDURES

Refer to the sections listed in the table below for component removal and replacement procedures.

ARMING SENSOR	Section 9J-B
DERM	Section 9J-B
DISCRIMINATING SENSORS:	
(Forward)	Section 9J-B
(Passenger Compartment)	Section 9J-B
INFLATOR MODULE	Section 3C
"INFLATOR RESTRAINT"	
INDICATOR LAMP	Metro Service Manual
RESISTOR MODULE	Section 9J-B
SIR COIL	Section 3C
SIR WIRING HARNESS	Section 9J

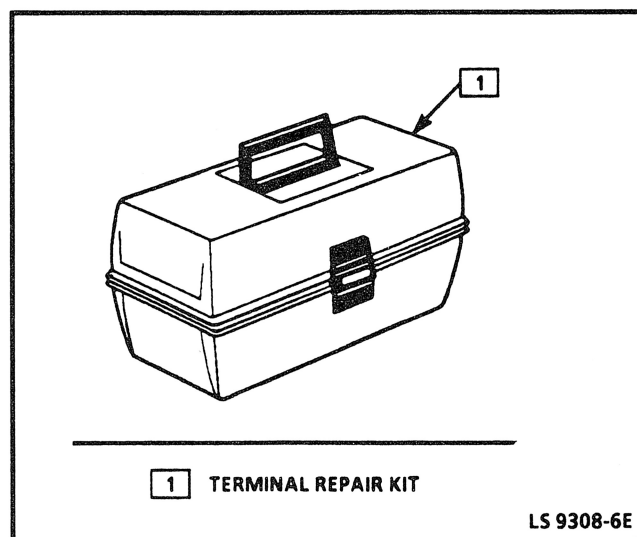


Figure 9J-12 - Wiring and Terminal Repair Kit

WIRING REPAIR

Special wiring repair procedures have been developed for use on the Supplemental Inflatable Restraint (SIR) system due to the sensitive nature of

9J-10 SIR DIAGNOSIS

the circuitry. These instructions are to be followed whenever Servicing the SIR system wiring.

TERMINAL REPAIR KIT

Figure 9J-12

Essential tool kit J 38125-A contains special "sealed splices" for use in repairing SIR system wiring. A special crimping tool, heat torch, and instruction manual for these splices are also included.

Two critical features of the sealed splices are a special heat shrink sleeve with sealing adhesive to produce an environmentally sealed splice and a cross hatched (knurled) core crimp to provide necessary contact integrity for the sensitive, low energy circuits.

Repair kit J 38125-A also serves as a generic terminal repair kit. The kit contains a large sampling of common GM electrical terminals and the correct tools to apply them to wires and remove them from connectors. The terminals in the kit are not to be used to replace damaged SIR system terminals unless otherwise indicated by the terminal package. Specifically, the DERM terminal repair assembly pack, is included in J 38125-A for SIR use.

SIR CONNECTOR (PLASTIC BODY AND TERMINAL METAL PIN) REPAIR

If any connector or terminal in the SIR wire harness (except pigtails) are damaged, the component should be repaired using one of the connector repair assembly packs. These kits include an instruction sheet and the sealed splices which will be necessary to splice the new wires, connector, and terminals to the harness. The crimping tool (the tool which is color keyed to match the splices) from terminal repair kit J 38125-A must be used to apply these splices.

The terminals in the SIR system are made of a special metal to provide necessary contact integrity for the sensitive low energy circuits. These terminals are only available in the connector repair assembly packs and no other terminal should be substituted.

If individual terminals are damaged on the DERM, they should be repaired using the DERM terminal repair assembly pack. If individual terminals are damaged on any other SIR connection, the entire connection should be replaced using the appropriate Connector Repair Assembly Pack if available. It may be necessary to replace the entire SIR system wiring harness.

SIR WIRE PIGTAIL REPAIR

If the wiring pigtail (wire attached directly to the device, not by a connector (Sensors, Coil or Inflator Module) are damaged, the entire component (with pigtail) must be replaced. Absolutely no wire, connector, or terminal repairs are to be attempted on

the Arming Sensor, Passenger Compartment Discriminating Sensor, the Forward Discriminating Sensor, the Inflator Module, or the SIR Coil.

SIR WIRE REPAIR

If any wire except the pigtail is damaged, the wire should be repaired by splicing in a new section of wire of the same gauge size (.5, .8, 1.0, etc.). The sealed splices and crimping tool from terminal repair kit J 38125-A must be used for these splices. Carefully follow the wiring repair procedures or the instructions included in the kit, for proper sealed splice application.

Step One: Open the Harness

If the harness is taped, remove the tape. To avoid wire insulation damage use a sewing "Seam ripper" to cut open the harness (available from sewing supply stores). The crimp and seal splice sleeves may be used on all types of insulation except tefzel and coaxial and may only be used to form a one to one splice.

Step Two: Cut the Wire

Begin by cutting as little wire off the harness as possible. You may need the extra length of wire later if you decide to cut more wire to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40 mm (1.5 in.) away from other splices, harness branches, or connectors.

Step Three: Strip the Insulation

If it is necessary to add a length of wire to the existing harness, be certain to use the same size as the original wire.

To find the correct wire size either find the wire on the schematic and convert the metric size to the equivalent AWG size or use an AWG wire gage.

If unsure about the wire size, begin with the largest opening in your wire stripper and work down until you get a clean strip of the insulation. Strip approximately 7.5 mm (5/16 in.) of insulation from each wire to be spliced. Be careful to avoid nicking or cutting any of the wires. Check the stripped wire for nicks or cut strands. If the wire is damaged, repeat this procedure after removing the damaged section.

Step Four: Select and Position the Splice Sleeve

Select the proper splice sleeve according to wire size. The splice sleeves and tool nests are color coded (see following chart).

Color Splice sleeve	Crimp tool nest color	Wire gage AWG/ (metric)
Salmon (yellow-pink)	Red	20, 18/ (0.5, 0.8)
Blue	Blue	16, 14/ (1.0, 2.0)
Yellow	Yellow	12, 10/ (3.0, 5.0)

CRIMP AND SEAL SPlice CHART

Using the J 38125-A splice crimp tool (see Figure 9J-7), position the splice sleeve in the proper color nest of the hand crimp tool. Place the splice sleeve in the nest so that the crimp falls midway between the end of the barrel and the stop.

The sleeve has a stop in the middle of the barrel to prevent the wire from going further (see Figure 9J-8). Close the hand crimper handles slightly to hold the splice sleeve firmly in the proper nest.

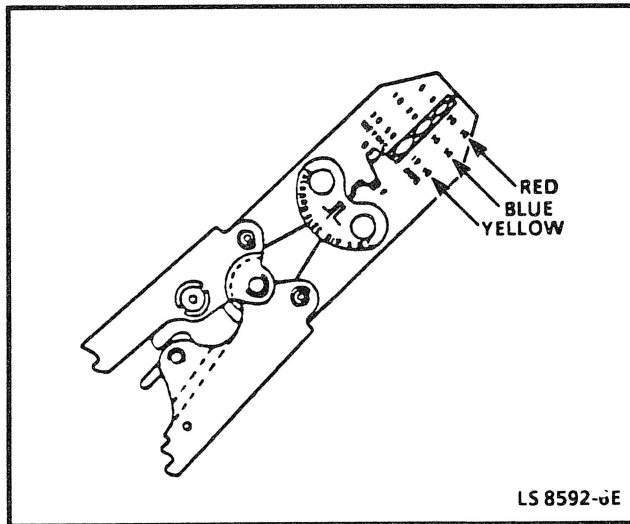


Figure 9J-13 - Hand Crimp Tool

Step Five: Insert Wires Into Splice Sleeve and Crimp

Insert the wire into the splice sleeve until it hits the barrel stop and close the handles of the dripper tightly until the crimper handles open when released (see Figure 9J-8). The crimper handles will not open until the proper amount of pressure is applied to the splice sleeve. Repeat steps 4 and 5 for opposite end of the splice.

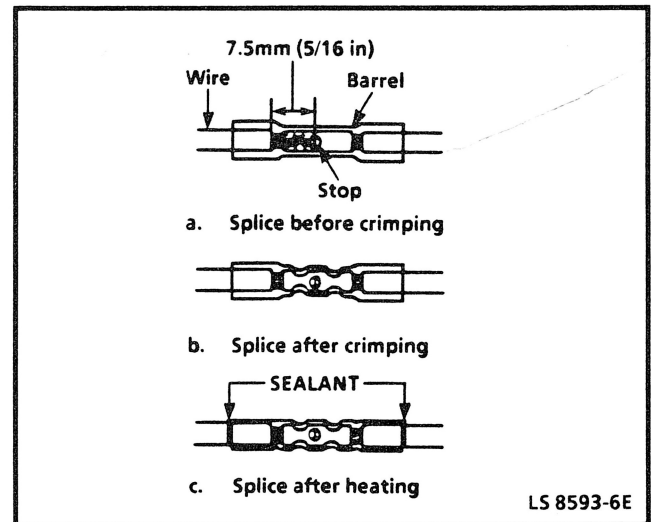


Figure 9J-14 - Seal Splice Sequence

Step Six: Shrink the Insulation around the Splice

Using the heat torch apply heat where the barrel is crimped.

Gradually move the heat barrel to the open end of the tubing, shrinking the tubing completely as the heat is moved along the insulation. A small amount of sealant will come out of the end of the tubing when sufficient shrinking is achieved. (see Figure 9J-8).

SIR SYSTEM WIRE SPlice REPAIR

If any of the original equipment splices (S201, etc., three wires or more) in the SIR system wiring are damaged they should be repaired by applying a new splice (not sealed) from terminal kit J 38125-A. Carefully follow the instructions included in the kit for proper splice clip application. Cloth duct tape may be substituted for splice tape if necessary.

ALTERNATIVE REPAIR METHODS

No alternative repair methods are available for the SIR system wiring and components.

S.I.R. System Connectors

The S.I.R. wiring system connectors are specially designed. There are several special features to each individual of the connectors. If a connector terminal, body, lock tab or shorting bar become damaged, the entire connector must be replaced as an assembly. There is no repair available for the connectors or their terminals. The only exception is the "Diagnostic Energy Reserve Module" (DERM) connector. A kit #12085510 is available to repair the "D.E.R.M." connector terminals only.

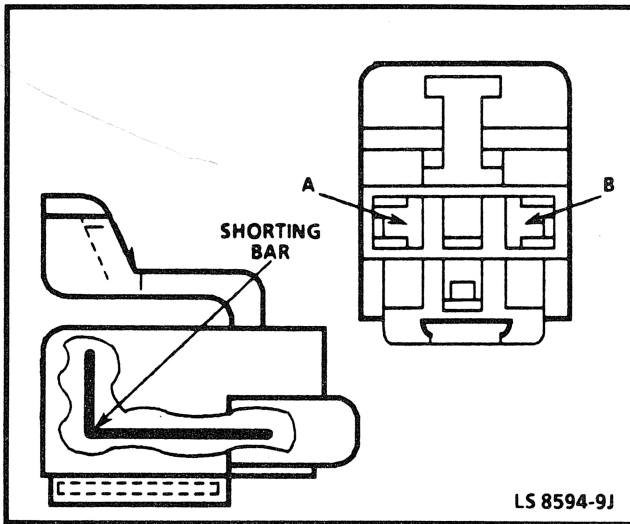


Figure 9J-15 - Connector Body

If the connector body is damaged, the entire DERM connector assembly must be replaced.

CONNECTOR TERMS

Connector Body *Figure 9J-15*

The connector body is made of an injection molded high impact plastic. The O connector body houses the terminals, shorting bar, and "Terminal Position Assurance" (TPA) insert. The terminals and shorting bar (if equipped) are seated in the connector body. The shorting bar and terminals are not removable.

CONNECTOR POSITION ASSURANCE (CPA) *Figure 9J-16*

The connector Position Assurance (CPA) is a small plastic insert that is inserted through the locking tabs of all of the SIR system connectors. The purpose of the C.P.A. is to assure the connector halves are securely connected and they cannot vibrate apart. The CPA has a pigtail that attaches it to the wiring harness. The CPA must be in place to assure a good contact between the SIR mating terminals. There are (2) styles of CPAs. Refer to Figure 9J-16.

TERMINAL POSITION ASSURANCE (TPA) *Figure 9J-16*

The terminal position assurance (TPA) insert is similar to the plastic combs used on ECM connectors. The function of the TPA is to keep the terminal securely seated in the connector body. The TPA is not to be removed from the connector body.

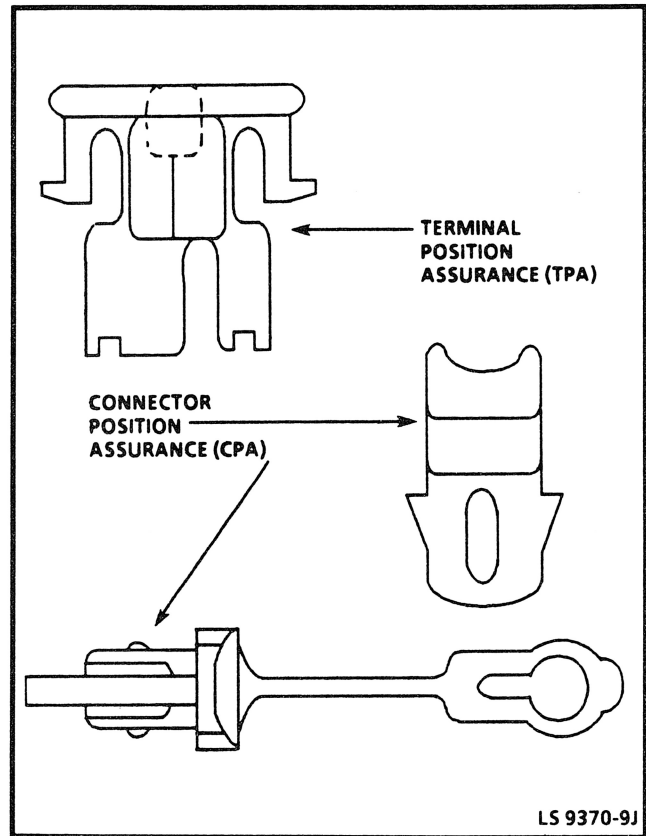
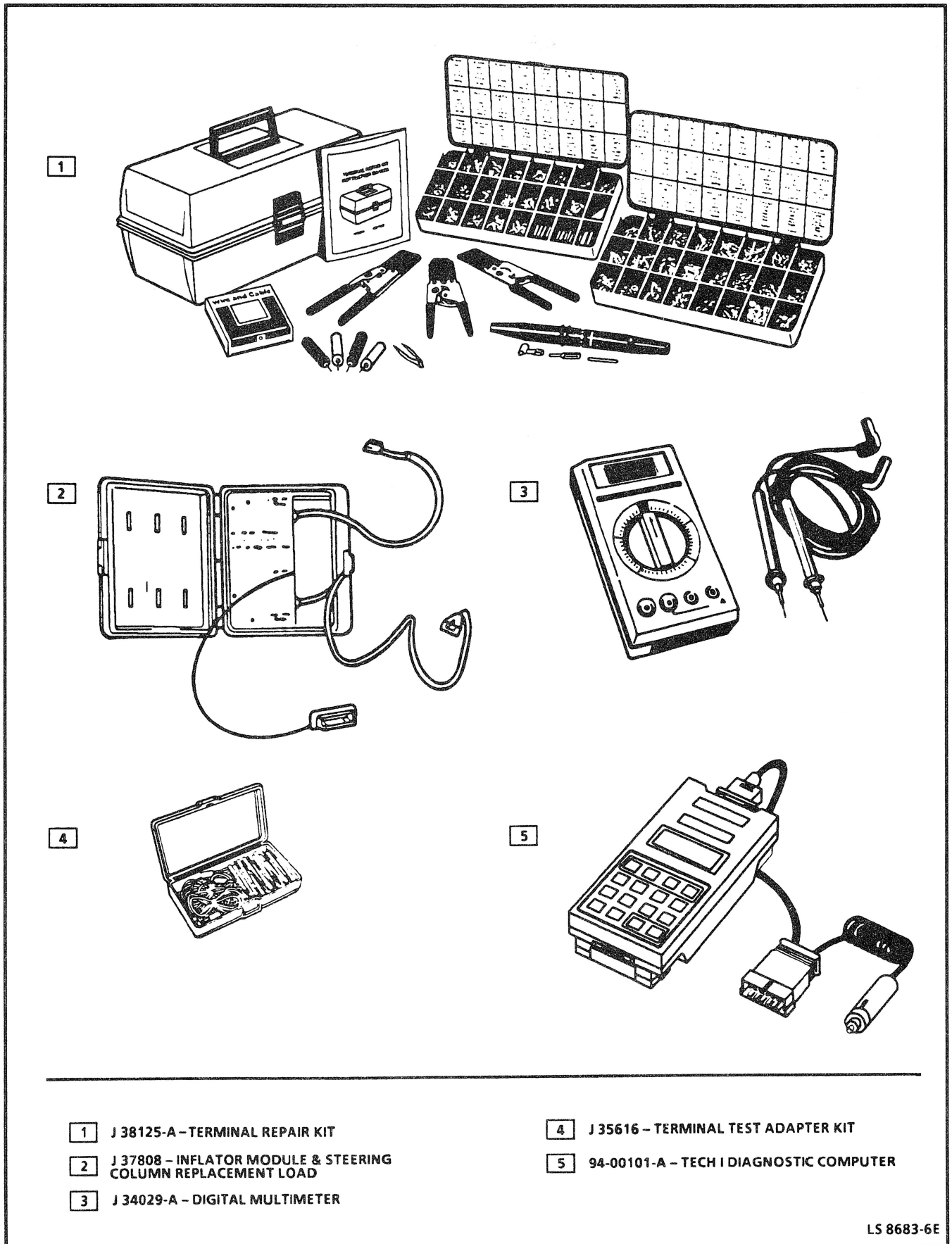


Figure 9J-16 - CPA and TPA



1 J 38125-A - TERMINAL REPAIR KIT

2 J 37808 - INFLATOR MODULE & STEERING
COLUMN REPLACEMENT LOAD

3 J 34029-A - DIGITAL MULTIMETER

4 J 35616 - TERMINAL TEST ADAPTER KIT

5 94-00101-A - TECH I DIAGNOSTIC COMPUTER

LS 8683-6E

Figure 9J-17 - SIR Required Tools

SERVICE PARTS INFORMATION:

PART NAME	SERVICE PARTS CATALOG REFERENCE NAME	SERVICE PARTS CAT. GROUP
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COMPONENTS

DERM	Module Asm-Infl Rst Resv Engy	14.865
Forward Discriminating Sensor .	Sensor Asm-Infl Rst F/End Sh Met	14.865
Passenger Compartment		
Discriminating Sensor	Sensor Asm-Infl Rst Pass Compt	14.865
Arming Sensor	Sensor Asm-Infl Ret Arming	14.865
"INFLATABLE RESTRAINT"		
indicator lamp		9.744
	(Standard Parts Cat.)	
Inflator Module	Module Asm-Infl Rst Resv Engy	14.865
knee Bolster	Bolster Asm I/P Drvr Knee	10.235
Resistor Module	Module, Infl Rst Syst Resistor	14.865
SIR Coil	Coil, Infl Res	14.865

CONNECTOR ASSEMBLY PACKS:

DERM	2.480
Forward Discriminating Sensor	2.530
Passenger compartment Discriminating Sensor	2.530
Arming Sensor	2.530
Resistor Module	2.480
Steering Column	2.530
DERM/Resistor Module Terminal Repair	13.1

SECTION 9J-A

SUPPLEMENTAL INFLATABLE RESTRAINT (SIR) SYSTEM DIAGNOSIS

CAUTION: To avoid deployment when troubleshooting the SIR system do not use electrical test equipment, such as battery powered or A/C powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than specified in this manual. Instructions in this manual must be followed carefully, otherwise personal injury may result.

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INTRODUCTION

GENERAL DESCRIPTION

The Supplemental Inflatable Restraint (SIR) System supplements the normal restraint of the driver's seat belt by deploying an air bag from the center of the steering wheel during an accident. The air bag deploys when the vehicle is involved in a front end collision of sufficient force. To further absorb the energy of an accident there is a knee bolster located beneath the instrument panel in the driver's area. The steering column continues to be collapsible.

SYSTEM DESCRIPTION

ELECTRICAL SYSTEM

The main portions of the SIR system are the Deployment Loop and the Diagnostic Energy Reserve Module (DERM). The main function of the deployment loop is to supply current through the Inflator Module in the steering wheel which will cause deployment of the air bag in the event of an accident severe enough to warrant deployment.

The Arming Sensor, SIR Coil, Inflator Module and Discriminating Sensors make up the deployment loop. The Arming Sensor switches power to the Inflator Module on the high side of the deployment loop. Either of the Discriminating Sensors can supply ground to the Inflator Module on the low side of the loop. The Inflator Module is only supplied sufficient current to deploy when the Arming Sensor and at least one of the two Discriminating Sensors close simultaneously.

The function of the Diagnostic Energy Reserve Module (DERM) is to supply the deployment loop with a 36 Volt Loop Reserve (36VLR) to assure sufficient energy to deploy the air bag for a few seconds after ignition voltage is lost in an accident. Deployment of the air bag can still take place without the DERM connected if adequate ignition voltage is present at the Arming Sensor.

Another function of the DERM is electrical system diagnostics. The DERM is utilized in conjunction with the resistors in the Arming Sensor. Discriminating Sensor and Resistor Module. These resistors make it possible for the DERM to detect circuit and component faults within the deployment loop. The DERM monitors the voltage drop across each component within the loop during normal non-deployment conditions. If the monitored voltages fall outside of expected limits, the DERM will indicate a fault through the storage of a malfunction code and the illumination of the "INFLATABLE RESTRAINT" indicator lamp.

COMPONENT DESCRIPTION

DERM:

The DERM (Diagnostic Energy Reserve Module) is designed to perform the following functions in the SIR system:

1. Energy reserve; The DERM maintains a 36 Volt Loop Reserve (36VLR) energy supply to provide deployment energy for a few seconds when the vehicle voltage is low or if lost in a vehicle accident.
2. Malfunction Detection; The DERM performs diagnostic monitoring of SIR system, electrical components.
3. Malfunction Recording; The DERM provides SIR system fault code information through a Tech 1 or the "INFLATABLE RESTRAINT" indicator light.

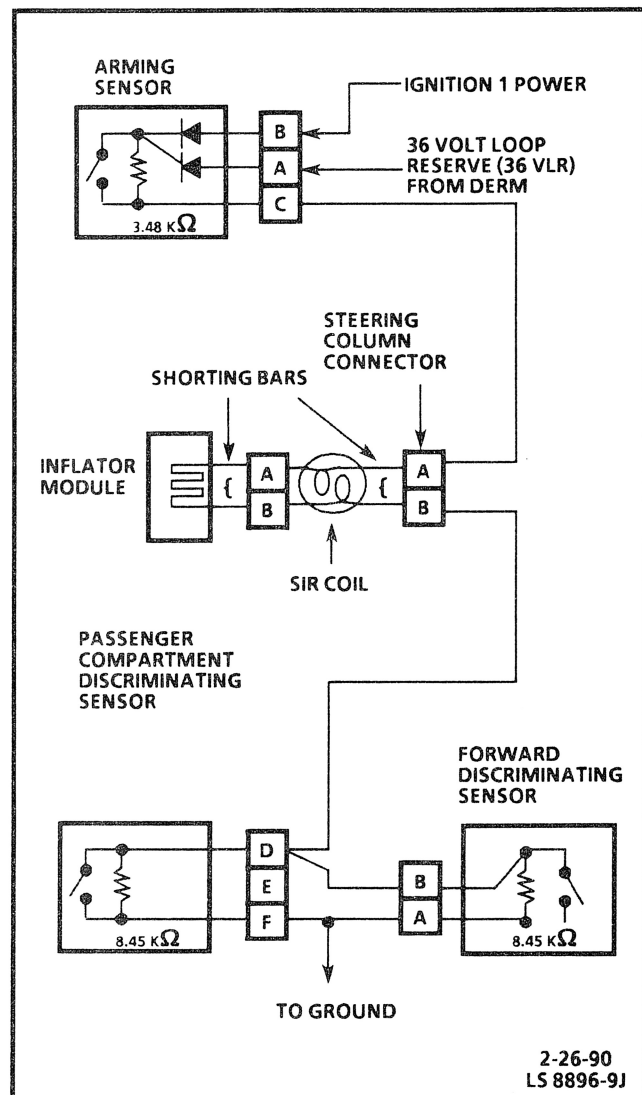


Figure 9J-A-1 Deployment Loop

4. Driver Notification; The DERM warns the vehicle driver of SIR system faults by controlling the "INFLATABLE RESTRAINT" indicator light.
5. Accident Recording; The DERM records the SIR system status during a vehicle accident.

The DERM is connected to the SIR harness by a 24 way connector. This harness connector utilizes a shorting bar across certain terminals in the contact area. This shorting bar connects the "INFLATABLE RESTRAINT" indicator input to ground when the DERM connector is disconnected. This will cause the "INFLATABLE RESTRAINT" indicator to come on steady whenever the ignition switch is at the RUN (BULB TEST) or START positions with the DERM disconnected.

"INFLATABLE RESTRAINT" INDICATOR

Battery voltage is applied to the "INFLATABLE RESTRAINT" indicator lamp when the Ignition Switch is at the RUN (BULB TEST) or START positions. The DERM controls the lamp by providing ground with a lamp driver. The "INFLATABLE RESTRAINT" indicator lamp is used in the SIR system to do the following:

1. Verify lamp and DERM operation by flashing 7 times when the ignition switch is first turned on.
2. Warn the vehicle driver of SIR electrical system faults which could potentially affect the operation of the SIR system. These faults could result in non-deployment in case of an accident or deployment for conditions less severe than intended.
3. Provide diagnostic information by flashing the fault codes when the flash code diagnostic mode is enabled.

The "INFLATABLE RESTRAINT" indicator lamp is the key to driver notification of SIR system faults. Proper lamp operation is verified by the "SIR Diagnostic System Check" in this section.

ARMING SENSOR

The Arming Sensor is a protective switch located in the power feed side (or high side) of the deployment loop. The Arming Sensor is calibrated to close at low level velocity changes (lower than the Discriminating Sensors). This assures that the Inflator Module is connected directly to the 36VLR output of the DERM or "Ignition 1" voltage when either of the Discriminating Sensors closes.

The Arming Sensor consists of a sensing element, normally open switch contact, a diagnostic resistor and two steering diodes. The sensing element closes the normally open switch contact when the velocity of the vehicle changes at a rate indicating potential need for deployment.

The diagnostic resistor is connected in parallel with the normally open switch contact and allows a small amount of current through the deployment loop during normal non-deployment conditions. This small current flow results in voltage drops across each component within the loop. The DERM monitors these voltage drops to detect circuit or component faults. The two steering diodes provide isolation between the 36VLR output of the DERM and "Ignition 1" voltage.

DISCRIMINATING SENSORS

There are two Discriminating Sensors in the SIR system. The Forward Discriminating Sensor is located in front of the radiator and the Passenger Compartment Discriminating Sensor is located in front of the console. The Discriminating Sensors are wired in parallel on the ground side (or low side) of the deployment loop. These sensors are calibrated to close with velocity changes which are severe enough to warrant deployment.

The Discriminating Sensors consist of a sensing element, normally open switch contact when the vehicle velocity changes are severe enough to warrant deployment.

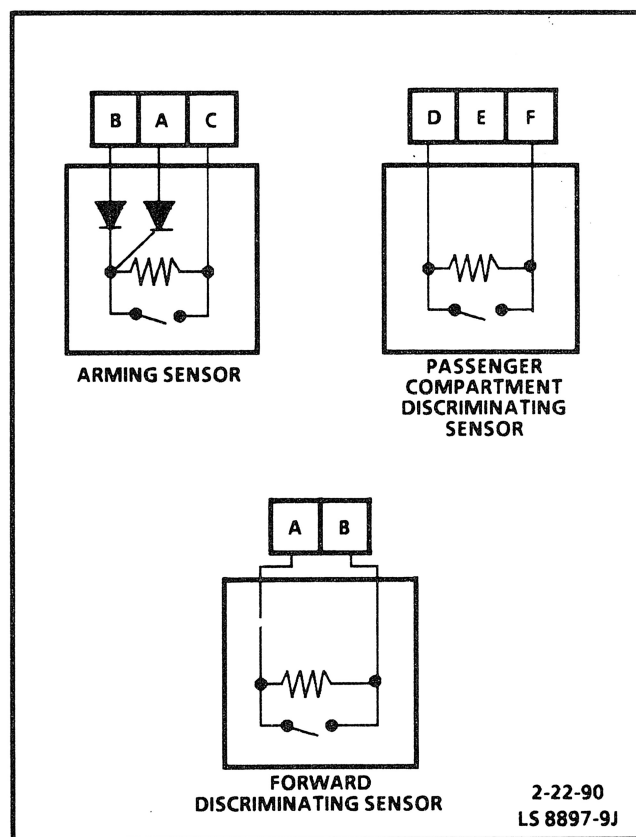


Figure 9J-A-2 Sensors

A diagnostic resistor is connected in parallel with the normally open switch contact within each of the Discriminating Sensors. These parallel resistors supply the ground path for the current passing through the deployment loop during normal non-deployment conditions. This small current flow results in voltage drops across each component within the loop. The DERM monitors these voltage drops to detect circuit or component faults.

SIR COIL ASSEMBLY

The SIR Coil consists of two current carrying coils. They are attached to the steering column and allow rotation of the steering wheel while maintaining continuous contact of the deployment loop through the Inflator Module.

There is a Shorting Bar on the lower steering column connector which connects the SIR Coil to the SIR harness. The Shorting Bar shorts the circuits to the main coil and Inflator Module when the lower steering column connector is disconnected. The circuit to the Inflator Module is shorted in this way to help prevent unwanted deployment of the air bag when servicing the steering column or other SIR components."

INFLATOR MODULE

The Inflator Module is located on the steering wheel. The Inflator Module consists of: an inflatable bag, inflator and initiator (a canister of gas-generating material and initiating device). When the vehicle is in an accident of sufficient force to close the Arming Sensor and at least one of the Discriminating Sensor simultaneously, current is developed through the deployment loop. Current passing through the initiator thus ignites the material in the Inflator Module. The gas produced from this reaction rapidly inflates the air bag.

There is a Shorting Bar on the Inflator Module side of the upper steering column connector which connects the SIR Coil to the Inflator Module. The Shorting Bar shorts the Inflator Module circuit when the SIR Coil connector is disconnected. The circuit to the Inflator Module is shorted in this way to help prevent unwanted deployment of the air bag when servicing the Inflator Module or steering column.

RESISTOR MODULE

The Resistor Module is inserted in the SIR harness between the Inflator Module and the DERM. The Resistor Module allows the DERM to monitor the deployment loop for faults and also allows the DERM to detect when a deployment has occurred.

The resistors in the Resistor Module are balanced with the resistors in the Arming and Discriminating Sensors to allow the DERM to monitor the voltage drops across the components of the deployment loop. Faults are detected during normal non-deployment conditions by monitoring these voltages.

DEFINITIONS

ALDL - Assembly Line Data Link.

ARMING SENSOR - A Sensor on the High side (or power side) of the deployment loop that is calibrated to supply voltage to the Inflator Module when the vehicle velocity changes are severe enough to warrant arming of the air bag.

"CONTINUOUS MONITORING" - Tests performed by the DERM on the SIR system every 100 milliseconds while "Ignition 1" voltage is present at the DERM.

DATA LINK - A signal wire used for communications between multiple on-board computers or from an on-board computer to an off-board computer.

DEPLOY - To inflate the bag located in the trim cover of the steering wheel.

DEPLOYMENT LOOP - The circuit that supplies current to the Inflator Module in the steering wheel to deploy the air bag.

DERM - Diagnostic Energy Reserve Module which provides reserve energy to the deployment loop and diagnostic monitoring of all system components.

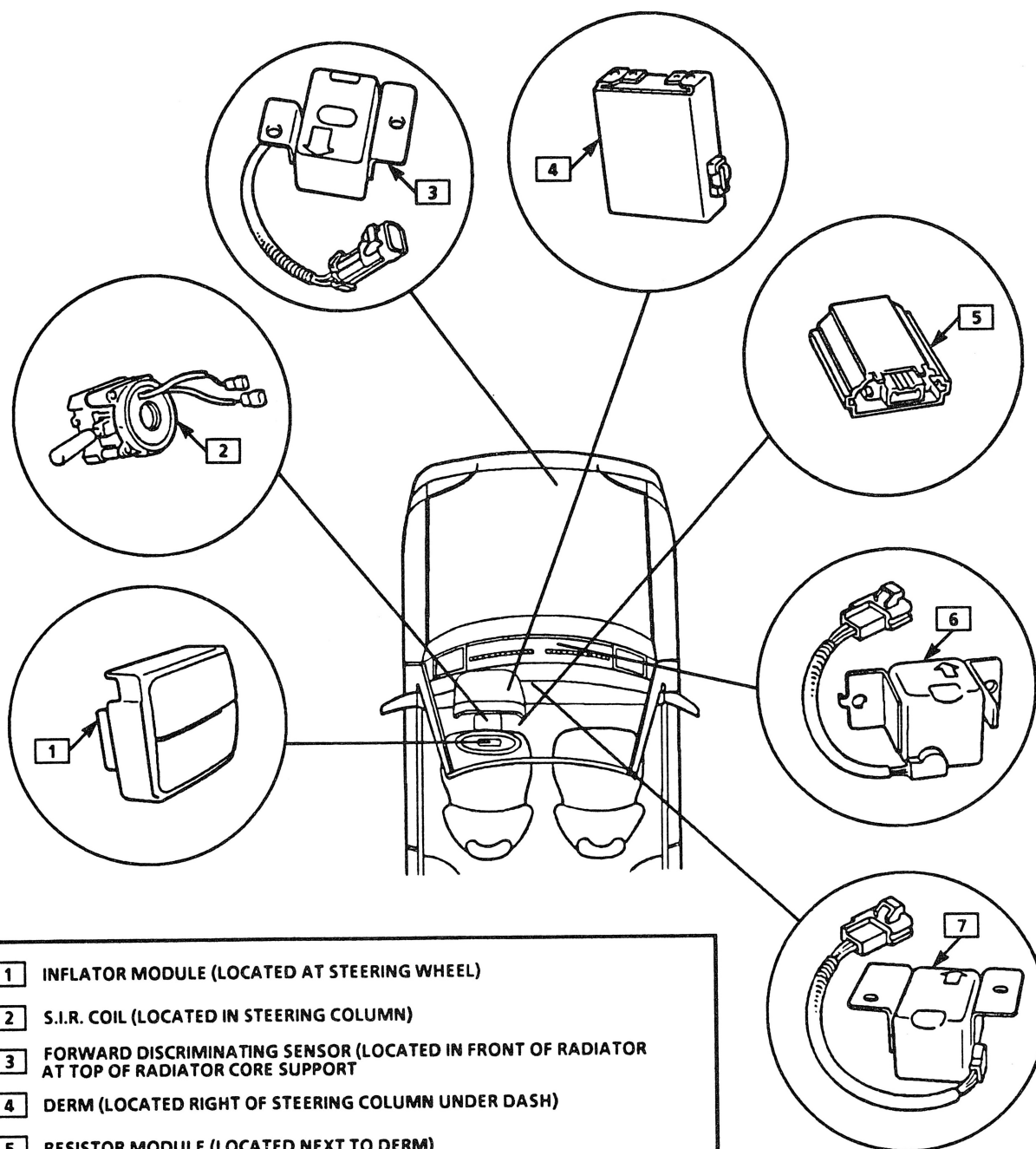
FORWARD DISCRIMINATING SENSOR - A sensor on the ground side (or low side) of the deployment loop that is calibrated to ground the Inflator Module when the vehicle velocity changes are severe enough to warrant deployment of the air bag.

EEPROM - Electrically Erasable Programmable Read Only Memory.

FORCE HI - An output of the DERM which injects current into the steering column circuit during the "Steering Column Resistance" tests.

FORCE LOW - An input of the DERM which grounds the steering column circuit during the "Steering Column Resistance" tests.

INFLATOR MODULE - An assembly located in the steering wheel hub beneath the vinyl trim cover consisting of an inflatable bag and the Inflator.



- 1** INFLATOR MODULE (LOCATED AT STEERING WHEEL)
- 2** S.I.R. COIL (LOCATED IN STEERING COLUMN)
- 3** FORWARD DISCRIMINATING SENSOR (LOCATED IN FRONT OF RADIATOR AT TOP OF RADIATOR CORE SUPPORT)
- 4** DERM (LOCATED RIGHT OF STEERING COLUMN UNDER DASH)
- 5** RESISTOR MODULE (LOCATED NEXT TO DERM)
- 6** ARMING SENSOR (LOCATED BEHIND GLOVE BOX AT UPPER COWL)
- 7** PASSENGER COMPARTMENT DISCRIMINATING SENSOR (LOCATED BEHIND IP)

Figure 9J-A - 3 SIR Component Location Guide

NSSS - Neutral Start Safety Swatch, switch to disable starter motor activation when the vehicle is not in Park or Neutral.

PASSENGER COMPARTMENT DISCRIMINATING SENSOR - A Sensor on the ground side (or low side) of the deployment loop that is calibrated to ground the Inflator Module when the vehicle velocity changes are severe enough to warrant deployment of the air bag.

RESISTOR MODULE - An assembly of resistors in the SIR harness between the DERM and steering wheel which allows the DERM to monitor the deployment loop for faults and detect when a vehicle accident has occurred.

"SCAN" TOOL - Tool used to read diagnostic information from the DERM via the ALDL connector.

SENSE HI - An input to the DERM on the high side of the deployment loop which the DERM monitors for fault detection.

SENSE LOW - An input to the DERM on the low side of the deployment loop which the DERM monitors for fault detection.

SIR - Supplemental Inflatable Restraint.

SIR COIL - A current carrying coil in the deployment loop that allows the rotation of the steering wheel while maintaining the continuous contact of the deployment loop through the Inflator Module.

WIRING HARNESS - The wires and connectors that electrically connect the components in the SIR system together.

"STEERING COLUMN RESISTANCE" - Inflator Module, SIR Coil and steering column wiring tests, which the DERM performs once each ignition cycle when no faults are detected during "Turn-On" or "Continuous Monitoring."

SYSTEM VOLTAGE - Voltage available at the battery at the time of the indicated voltage measurement. With the key "ON" and engine not running, the system voltage will likely be between 12 and 12.5 volts. At idle the voltage may be 14 to 16 volts. The voltage could be as low as 10 volts during engine cranking.

"TURN-ON" - Tests which the DERM performs on the SIR system once during each ignition cycle immediately after "Ignition 1" voltage is applied to the DERM.

36VLR - The 36 Volt Loop Reserve energy supply from the DERM which provides deployment power when vehicle voltage is low or is lost in an accident.

HOW TO USE THIS SECTION

DIAGNOSTIC PROCEDURES

The diagnostic procedures used in this section are designed to aid in finding and repairing SIR System problems. Outlined below are the steps to find and repair SIR System problems quickly and effectively. Not carefully following these procedures may result in extended diagnostic time, incorrect diagnosis and incorrect part replacements.

1. PERFORM THE "SIR DIAGNOSTIC SYSTEM CHECK."

The "SIR Diagnostic System Check" should always be the starting point of any SIR diagnostics. The "SIR Diagnostic System Check" checks for SIR trouble codes using either "Flash Code" or "Scan" tool methods, as preferred.

2. REFER TO THE PROPER DIAGNOSTIC CHART AS DIRECTED BY THE "SIR DIAGNOSTIC SYSTEM CHECK."

The "SIR Diagnostic System Check" will lead you to the correct chart to diagnose any SIR problems. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis and incorrect part replacements.

3. REPEAT THE "SIR DIAGNOSTIC SYSTEM CHECK" AFTER ANY REPAIR OR DIAGNOSTIC PROCEDURES HAVE BEEN PERFORMED.

Performing the "SIR Diagnostic System Check" after all repair or diagnostic procedures will assure that the repair has been made correctly and that no other conditions exist.

TROUBLE CODES

The DERM maintains a history of all trouble codes that have been detected since the SIR codes were last cleared during service. The trouble codes are also stored according to class:

1. **Current Codes** - Faults that are presently being detected. Current codes are stored in RAM (Random Access Memory).
2. **History Codes** - All faults detected since the last time the EEPROM fault memory was cleared. History codes are stored in EEPROM.

How To Read Trouble Codes

Current codes can be read by using flash code or "Scan" tool diagnostics. The presence of any history codes can be determined by using flash code diagnostics; however, the specific history code numbers can be read and cleared only by using "Scan" tool diagnostics.

How Clear History Codes

History codes can only be cleared by using a "Scan" tool. If a "Scan" tool is not available, inform the owner of the stored codes and suggest that the codes be cleared upon the next visit to a GM dealership.

Flash Code Diagnostics

Flash Code diagnostics can only be used to read current codes and to determine if history codes are present. Flash code diagnostics cannot be used to clear codes or read history codes. Flash code diagnostics is enabled by grounding terminal "K" of the ALDL connector pulls the "Diagnostic Request" input (terminal "A5") of the DERM low and signals the DERM to enter the flash code diagnostic display mode.

The DERM displays the trouble codes by flashing the "INFLATABLE RESTRAINT" indicator with a lamp driver at the "SIR Indicator Low" output (terminal "A1"). Each code that is displayed will consist of a number of flashes which represents the tens or first digit, a 1/2 second pause, followed by a number of flashes which represents the ones or second digit of the code. After all of the codes have been displayed, the entire code sequence will continually be repeated until ground is removed from terminal "K" of the ALDL connector.

Two special codes exist when reading in the flash code mode (Flash Code 12 and Flash Code 13). Code 12 will always be the first code displayed when the flash code mode is enabled. Code 12 is not an indication of a SIR fault, but an indication that the flash code mode has been enabled. If there are no current or history codes present the DERM will display code 12 until ground is removed from the ALDL connector at terminal "K". Flash Code 13 will be displayed if there are history codes or if there are codes in history that are not current. To read the history codes a "Scan" tool must be used.

"Scan" tool Diagnostics

A "Scan" tool can be used to read current and history codes and to clear all history codes after a repair is complete. The "Scan" tool must be updated to communicate with the SIR system through a replaceable cartridge or a manufacturer's update before it can be used for SIR diagnostics.

To use the "Scan" tool, connect it to the ALDL connector and turn the ignition switch "ON." Follow the manufacturer's direction for communication with the SIR system. The "Scan" tool reads serial data from the DERM "Data Link" output (terminal "A8") to the ALDL connector (terminal "M").

BASIC ELECTRICAL CIRCUITS

You should understand the basic theory of electricity including series and parallel circuits, and understand the voltage drops across series resistors. You should know the meaning of voltage (volts), current (amps), and resistance (ohms). You should understand what happens in a circuit with an open or a shorted wire. You should be able to read and understand a wiring diagram.

USE OF SPECIAL TOOLS

You should be familiar with the tools listed under the heading "SPECIAL TOOLS." You should be able to measure voltage, resistance, and current. You should be familiar with proper use of the "Scan" tool and DVOM.

ON-VEHICLE SERVICE

SERVICE PRECAUTIONS

GENERAL SAFETY PROCEDURES

The DERM can maintain sufficient voltage to cause a deployment for up to 10 minutes after the Ignition Switch is turned off and the battery is disconnected. Many of the service procedures require disconnection of the Inflator Module from the deployment loop to avoid an accidental deployment. The following procedure will disable the SIR system.

1. Turn ignition switch "OFF."
2. Disconnect negative battery cable.
3. Remove the (CPA). Connector Positive Assurance lock on the yellow 2-way connector at the back of the steering wheel.
4. Disconnect the yellow 2-way connector at the back of the steering wheel.

When all service work is completed, the following procedure should be followed.

1. Connect the yellow 2-way connector at the back of the steering wheel.
2. Install the (CPA) Connector Positive Assurance lock on the yellow 2-way connector at the back of the steering wheel.

3. Connect negative battery cable.
4. Turn ignition switch to "ON" and make sure the "INFLATABLE RESTRAINT" light flashes 7 times and then goes out. If the light does not operate as indicated, refer to "SIR DIAGNOSTIC SYSTEM CHECK" in section "9J-A".

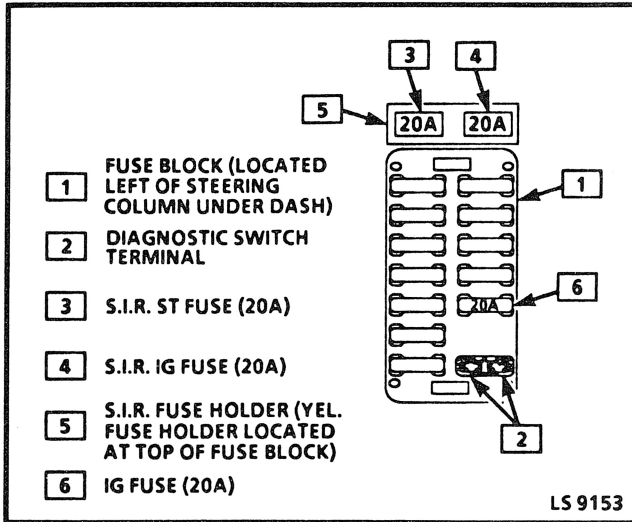


Figure 9J-A-4 Fuse Block

SENSORS

All sensors are specifically calibrated to each vehicle series and are keyed to the mounting brackets and the SIR wiring harness. Caution should be used to assure proper location of the sensors to their mounting brackets. The keying of the sensors to their mounting brackets and wiring harness should never be modified in the field. Refer to Section "9J-B" for Forward Discriminating Sensor, Passenger Discriminating Sensor and Arming Sensor remove and replace procedures.

CAUTION: Be very careful when handling a sensor. Never strike or jar a sensor. If you do it could cause deployment and result in personal injury or improper operation of the Supplemental Inflatable Restraint (SIR) System. All sensors and mounting bracket bolts must be carefully torqued to assure proper operation. Never power up the SIR system when any sensor is not rigidly attached to vehicle, since the sensor is easily activated when not attached and could result in deployment.

INFLATOR MODULE

LIVE (UNDEPLOYED) INFLATOR MODULES

Special care is necessary when handling and storing a live (undeployed) Inflator Module. The rapid gas generation produced during deployment of the air bag could cause the Inflator Module, or object in front of the Inflator Module, to be thrown through the air in the unlikely event of an accidental deployment.

CAUTION: When carrying a live Inflator Module, make sure the bag and trim cover are pointed away from you. In case of an accidental deployment, the bag will then deploy with minimal chance of injury. When placing a live Inflator Module on a bench or other surface, always face the bag and trim cover up, away from the surface. This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment. Otherwise, personal injury may result. Also, never carry the Inflator Module by the wires or connector on the underside of the module.

INFLATOR MODULE SCRAPPING PROCEDURES

CAUTION: Failure to follow proper SIR inflator module disposal procedures can result in air bag injury. Undeployed inflator modules must not be disposed of through normal refuse channels. The undeployed inflator module contains substances that can cause severe illness or personal injury if the sealed container is damaged during disposal. Disposal in any manner inconsistent with proper procedures may be a violation of federal, state and/or local laws.

Chevrolet dealers should refer to the latest Service bulletins for proper SIR Inflator Module disposal procedures. All others should contact a local Chevrolet dealership for proper SIR Inflator Module disposal procedures.

VEHICLE SCRAPPING PROCEDURES

Some vehicles equipped with SIR systems that have live (undeployed) Inflator Modules may have to be scrapped because they have completed their useful life or have been severely damaged in a nondeployment type accident. The following procedure should be followed when scrapping a vehicle with an undeployed module.

1. Turn ignition switch "OFF."

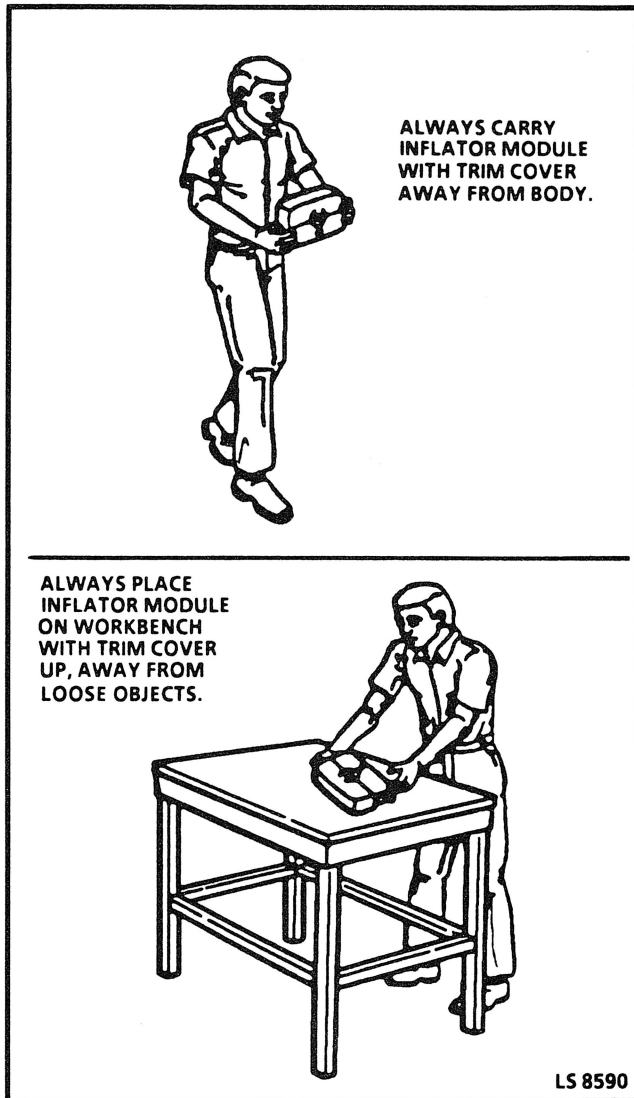


Figure 9J-A-5 Proper Live Inflator Module Handling

2. Disconnect the yellow 2-way connector at the base of the steering column.
3. Cut the harness side of the SIR wiring approximately 3 to 6 inches from the yellow 2-way connector.
4. Splice 2 wires at least 20 feet long to the wiring attached to the yellow 2-way that was cut from the SIR harness wiring in step 3.
5. Connect the yellow 2-way connector with 20 foot wires attached to yellow 2-way SIR connector at the base of the steering column.
6. Check that the Inflator Module is secured to the steering wheel.
7. Remove all loose objects from front seat.
8. Be sure no one is in the vehicle.
9. Stretch wires away from car to their full length.
10. To deploy air bag connect one wire to a 12 volt source and the other to ground.
11. Do not touch Inflator Module area for 20 minutes, due to heat generated during deployment.

12. Wear gloves and safety glasses if you handle the deployed air bag. Wash your hands with mild soap and water afterwards.

DEPLOYED INFLATOR MODULES

After an Inflator Module has been deployed, the surface of the air bag may contain a small amount of sodium hydroxide dust (a by-product of the reaction which takes place during deployment) combined with a white packing powder (used to ease deployment of the bag). The sodium hydroxide dust could be irritating to the skin if left on for an extended period of time.

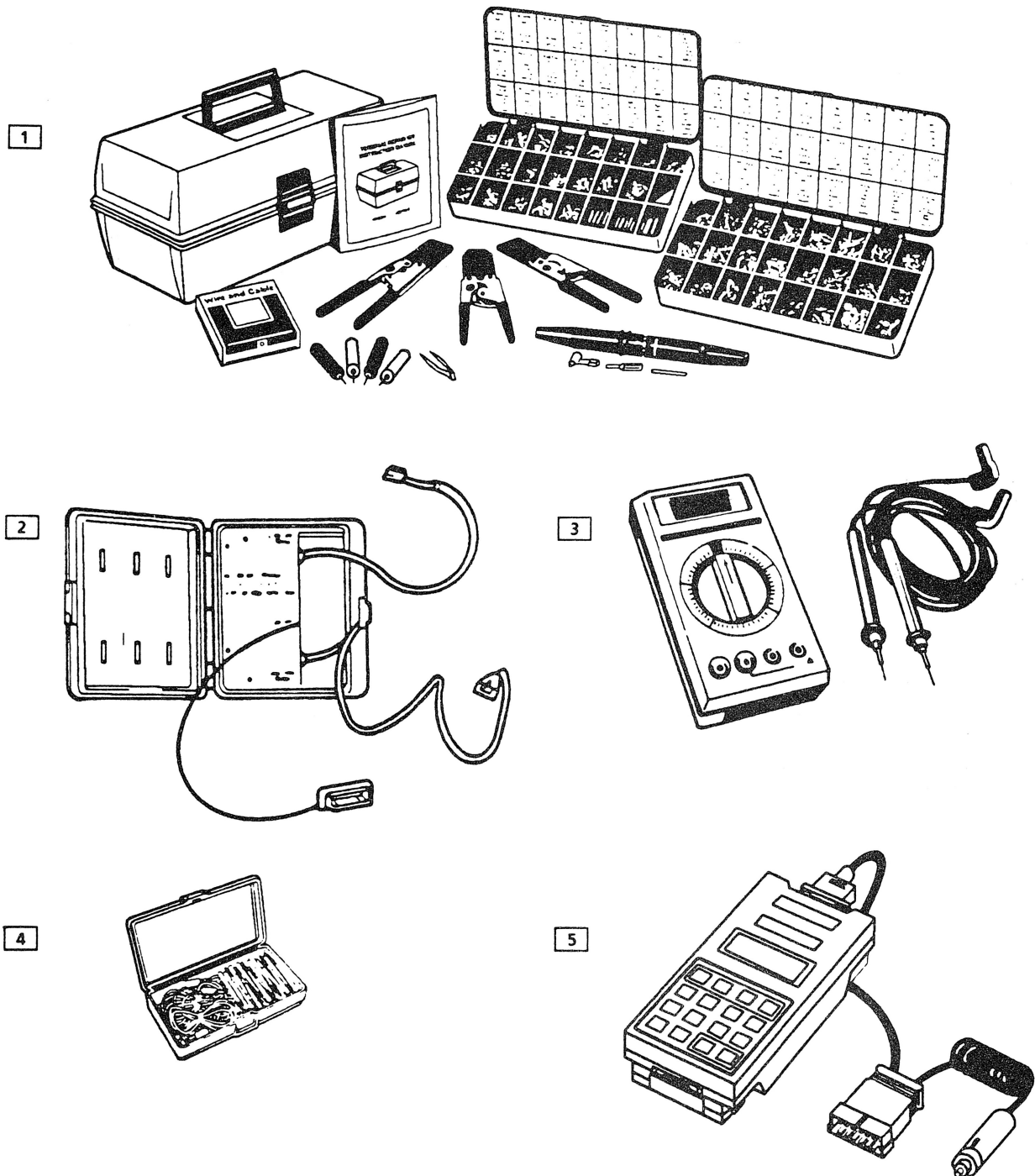
CAUTION: Safety precautions must be observed when handling a deployed Inflator Module. After deployment, the air bag surface may contain deposits of sodium hydroxide dust, a by-product of the sodium azide reaction during deployment that is irritating to the skin. Always wear gloves and safety glasses when handling a deployed Inflator Module, and wash your hands with mild soap and water afterwards.

INSPECTIONS REQUIRED AFTER AN ACCIDENT

Important

- All SIR system components, including harness and brackets, must be inspected after an accident. If any are damaged or bent, they must be replaced even if a deployment did not occur. Inspect steering column, (see Steering Column Unit Repair), knee bolster for damage. Do not attempt to service the forward discriminating sensor, passenger compartment discriminating sensor, arming sensor, DERM, SIR Coil, or inflator module. Service is by replacement only with the crimp and seal splice sleeves contained within tool J 38125-A.

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the dial arming sensor, forward discriminating sensor Passenger Compartment Discriminating Sensor, and the inflator module. Any visible damage to the sensors and/or their respective mounting brackets requires replacement, whether a deployment occurred or not.



1 J 38125-A - TERMINAL REPAIR KIT

2 J 37808 - INFLATOR MODULE & STEERING COLUMN REPLACEMENT LOAD

3 J 34029-A - DIGITAL MULTIMETER

4 J 35616 - TERMINAL TEST ADAPTER KIT

5 94-00101-A - TECH I DIAGNOSTIC COMPUTER

MS 8683

Figure 9J-A - 6 SIR Required Tools

REMOVAL AND INSTALLATION PROCEDURES

Refer to the section listed in the table below for component removal and replacement procedures.

ARMING SENSOR	SECTION 9J-B
DERM	SECTION 9J-B
DISCRIMINATING SENSORS:	
(FORWARD)	SECTION 9J-B
(PASSENGER	
COMPARTMENT)	SECTION 9J-B
INFLATOR MODULE	SECTION 3C
"INFLATABLE RESTRAINT"	
INDICATOR LAMP	SECTION
	METRO
	SERVICE
	MANUAL
RESISTOR MODULE	SECTION 9J-B
SIR COIL	SECTION 3C
SIR WIRING HARNESS	SECTION 9J

SPECIAL TOOLS

CAUTION: To avoid deployment when trouble shooting the SIR system, do not use electrical test equipment such as test lights, battery powered or A/C powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than those specified in this manual. Instructions in this manual must be followed carefully, otherwise personal injury may result.

Recommended Tool:

Bi-directional "Scan" tool

Required Tools:

J34029A - Digital Volt Ohmmeter (DVOM)

J37808A - Inflator Module and steering column replacement load.

J35616 - Connector Test Adapter Kit.

J38125A - Wire Repair Kit.

WIRING REPAIR

Wiring repair procedures are included in Sections "8A" and "9J" of the service manual. When repairing any wiring associated with the Inflatable Restraint system **ALWAYS USE THE "CRIMP AND SEAL SPLICE SLEEVES" CONTAINED WITHIN TOOL J 38125A.**

SERVICE PARTS INFORMATION

PART NAME	SERVICE PARTS CATALOG REFERENCE NAME	SERVICE PARTS CATALOG GROUP
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COMPONENTS

DERM	Module Asm-Infl Rst Resv Engy	14.865
Forward Discriminating Sensor ..	Sensor Asm-Infl Rst F/End SH Met	14.865
Passenger Compartment		
Discriminating Sensor	Sensor Asm-Inf Rst Pass Compt	14.865
Arming Sensor	Sensor Asm-Inf Rst Arming	14.865
"Inflatable Restraint" Indicator		
Lamp		9.744
	(Standard Parts Cat.)	
Inflator Module	Module Asm-Infl Rst Resv Engy	14.865
Knee Bolster	Bolster Asm I/P Drvr Knee	10.235
Resistor Module	Module, Infl Rst Syst Resistor	14.865
SIR Coil Assembly	Coil, Infl Res	14.865

CONNECTOR ASSEMBLY PACKS:

DERM	2.480
Forward Discriminating Sensor	2.530
Passenger Compartment Discriminating Sensor	2.530
Arming Sensor	2.530
Resistor Module	2.480
Steering Column	2.530
DERM/Resistor Module Terminal Repair	13.1

BLANK

CAUTION: To avoid deployment when troubleshooting the SIR system, do not use electrical test equipment such as test lights, battery powered or A/C powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than those specified in this manual. Instructions in this manual must be followed carefully, otherwise personal injury may result.

SIR DIAGNOSTIC SYSTEM CHECK

The diagnostic procedures used in this section are designed to find and repair SIR System problems. To get the best results, it is important to utilize the diagnostic charts and follow the sequence listed below.

A. PERFORM THE "SIR DIAGNOSTIC SYSTEM CHECK."

The "Sir Diagnostic System Check" should be the starting point of any SIR diagnostics. The "SIR Diagnostic System Check" checks for proper "INFLATABLE RESTRAINT" indicator operation and checks for SIR trouble codes.

B. REFER TO THE PROPER DIAGNOSTIC CHART AS DIRECTED BY THE "SIR DIAGNOSTIC SYSTEM CHECK."

The "SIR Diagnostic System Check" will lead you to the correct chart to diagnose any SIR problems. Bypassing these procedures may result in extended diagnostic time.

C. REPEAT THE "SIR DIAGNOSTIC SYSTEM CHECK" AFTER ANY REPAIR OR DIAGNOSTIC PROCEDURES HAVE BEEN PERFORMED.

Performing the "SIR Diagnostic System Check" after all repair or diagnostic procedures will assure that the repair has been made correctly and that no other conditions exist.

Description:

When the ignition switch is first turned "ON," system voltage is applied through the SIR FUSE to the DERM at the "Ignition 1" input and through IG FUSE to the DERM at the "SIR Indicator Low" and "SIR Indicator High" inputs. The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

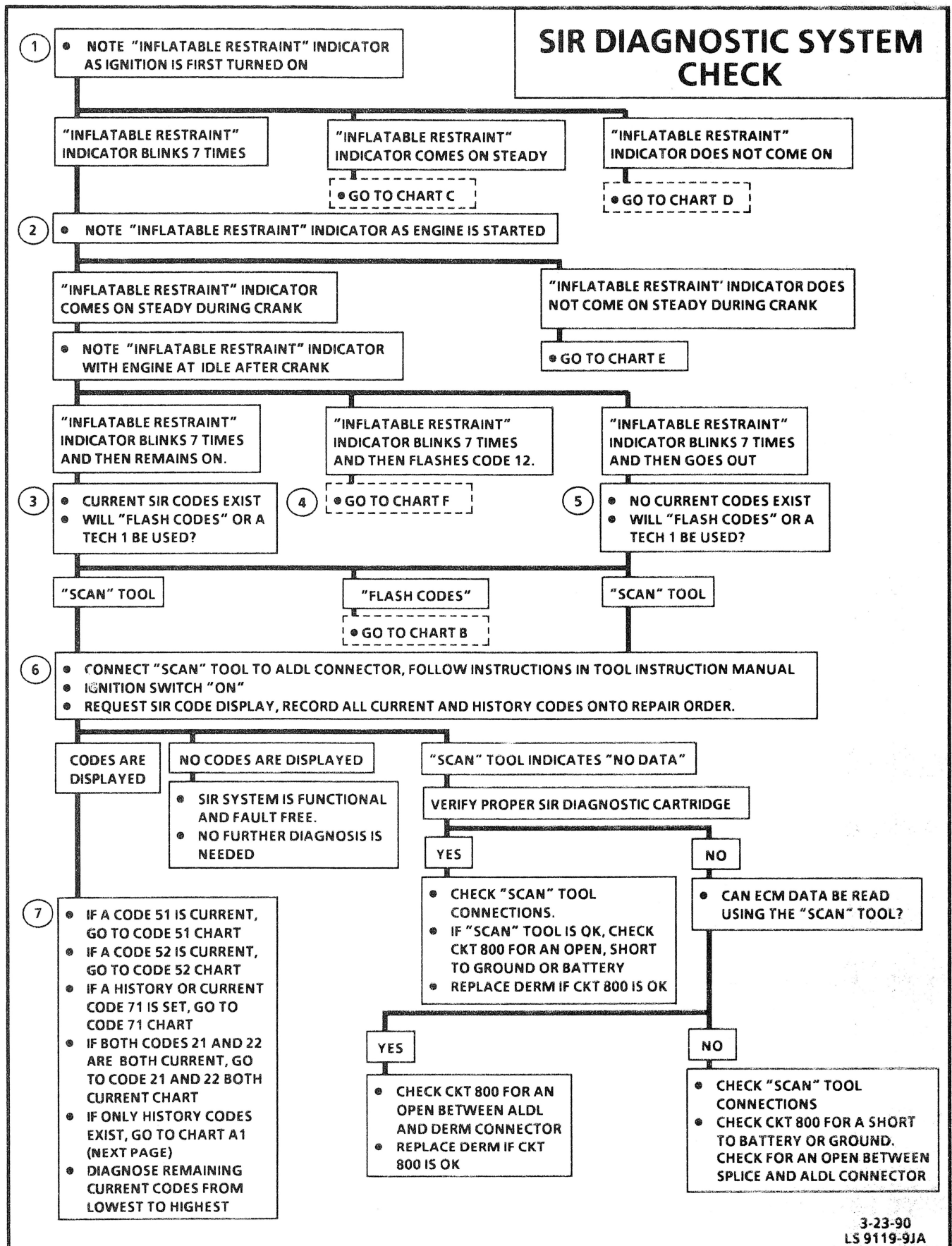
When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input.

This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times.

Notes on Fault Tree:

1. The "INFLATABLE RESTRAINT" indicator should blink 7 times as the ignition is just turned "ON." If the indicator does not respond use CHART C or D to diagnose the indicator malfunction.
2. As the engine is "Cranked" the "INFLATABLE RESTRAINT" indicator should remain on steady. If the indicator does not respond use CHART E to diagnose the malfunction.
3. The "INFLATABLE RESTRAINT" indicator has completed the "Bulb Check" and remains "ON" indicated a current code has been detected. At this point a "Scan" tool or the "INFLATABLE RESTRAINT" indicator can be used to diagnose the malfunction. For "Flash Code" diagnosis use CHART B.
4. After "Cranking" the engine the "INFLATABLE RESTRAINT" indicator should blink 7 times and then go out. If the indicator begins to flash a Code 12, there is a system fault. Use CHART F to diagnose the malfunction.
5. The "INFLATABLE RESTRAINT" indicator has completed the "Bulb Check" and is indicating no current codes exist.
6. Record all codes (both History and Current) onto the repair order. If there are no codes (History or Current) record this fact onto the repair order. No further diagnosis is required. If the "Scan" tool indicates that no data is being received from the DERM, then the data link will require repair.
7. If multiple codes are displayed (History or Current). The order that the codes are diagnosed is very important. Refer to the recommended charts.



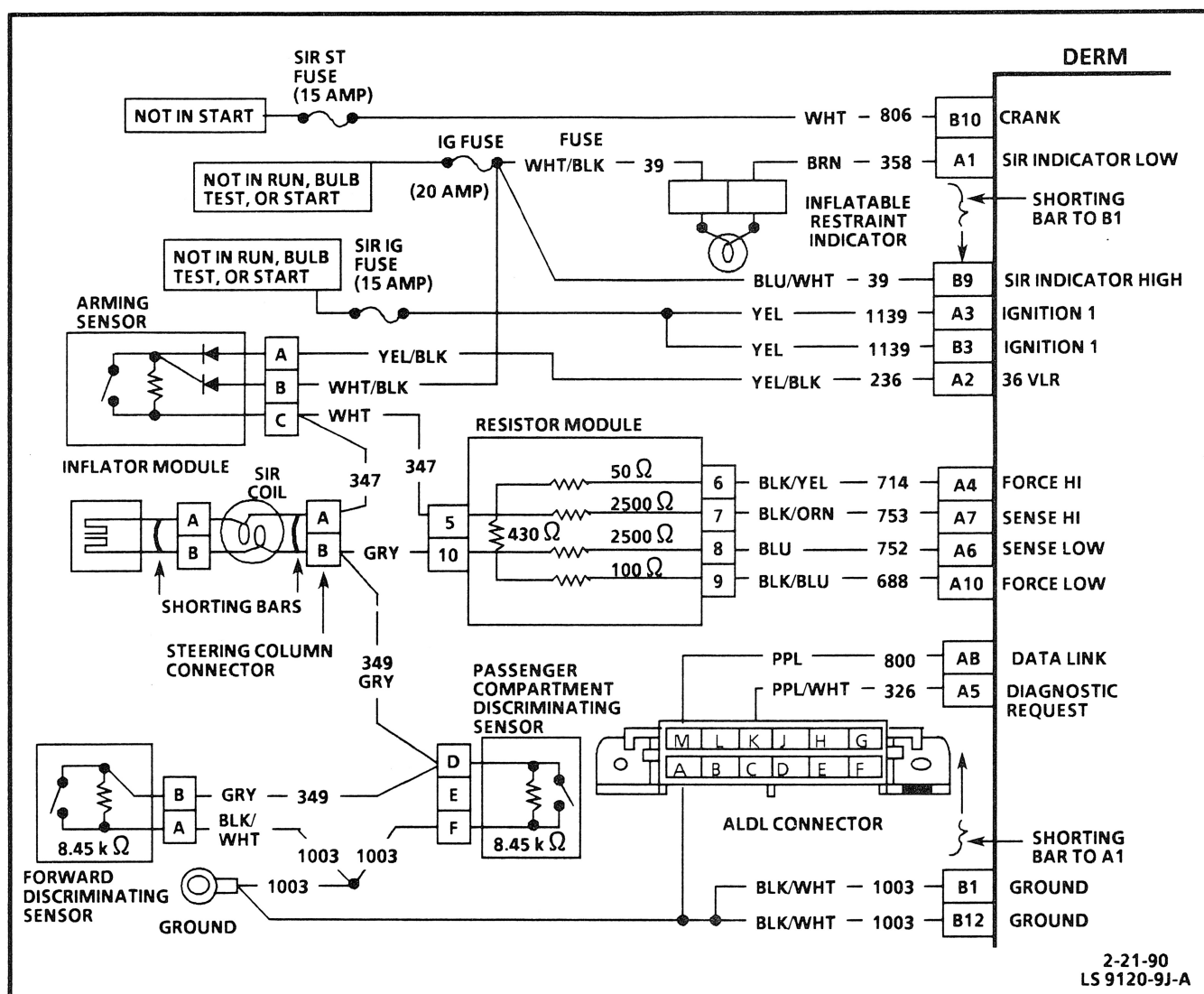


CHART A1

"SCAN" TOOL HISTORY CODE DIAGNOSIS

Description:

When the ignition Switch is first turned "ON" system voltage is applied through IG FUSE to "SIR Indicator High" ("B9") and to the "INFLATABLE RESTRAINT" Indicator Lamp which is connected to "SIR Indicator Low" ("A1"). SIR FUSE also applies system voltage to the "Ignition 1" inputs ("A3" and "B3"). The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times.

Notes on Fault Tree:

1. The DERM determines that the Arming Sensor is closed when system voltage or more is present at the "Sense Hi" input, and it determines that a Discriminating sensor is closed when it notes low

voltage at the "Sense Low" input. There are some faults that may "look" like an accident to the DERM, and therefore record a Code 51. History Code 51 therefore is not proof that the vehicle was in an accident.

2. Checks for intermittent electrical conditions within the steering column.
3. Checks for intermittent shorts in the 36VLR wiring (CKT 236).
4. Checks for misinstalled IG FUSE and "INFLATABLE RESTRAINT" Indicator bulb or uncleared Code 61 after a completed wiring repair on CKT 39. Also checks for intermittent faults in CKT 688 and CKT 358.
5. Checks for intermittent opens in the ground path of the deployment loop between the base of the steering column and both discriminating sensors (CKT 349-three branches).
6. Checks for intermittent wiring shorts between 36VLR CKT 236, CKT 347 and CKT 349 of the SIR wiring harness.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS A TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART A1

"SCAN" TOOL HISTORY CODE DIAGNOSIS

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J-34029A DVOM WITH THE CORRECT PROBE FROM J-35616. SEE "CAUTION" ABOVE.

- IS THERE MORE THAN ONE HISTORY CODE SET?

NO

YES

- GO TO CHART 42

- IS HISTORY CODE 51 SET?

NO

YES

①

- THIS CODE INDICATES THAT THE DERM "DETECTED" AN ACCIDENT. THIS CODE CANNOT BE CLEARED - SYSTEM REQUIRES NO FURTHER DIAGNOSIS. SEE CODE 51 FAILURE CONDITIONS FOR MORE INFORMATION.

- IS HISTORY CODE 21, 22, 24 OR 26 SET?

NO

YES

②

- CHECK FOR INTERMITTENT SHORTS OR GROUNDS WITHIN THE STEERING COLUMN. WITH THE IGNITION "ON", ENGINE AT IDLE, SLOWLY TURN THE STEERING WHEEL FROM FULL LOCK LEFT TO FULL LOCK RIGHT A NUMBER OF TIMES. OBSERVE THE "INFLATABLE RESTRAINT" INDICATOR. IF THE LIGHT COMES "ON" A CODE IS NOW CURRENT. WITH THE WHEEL IN THIS POSITION, RETURN TO THE "SIR DIAGNOSTIC SYSTEM CHECK."

- IS HISTORY CODE 33 SET?

NO

YES

- GO TO HISTORY CODE 33 CHART

- IS HISTORY CODE 41 OR 42 SET?

NO

YES

③

- INSPECT 36VLR CKT 236 BETWEEN DERM AND ARMING SENSOR FOR INTERMITTENT SHORTS TO GROUND OR VOLTAGE. REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J-38125.
- CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- IS HISTORY CODE 61 SET?

NO

YES

④

- THIS CODE WILL SET IF 20 AMP IG FUSE OR THE "INFLATABLE RESTRAINT" BULB IS OPEN OR REMOVED. IF A WIRING FAULT EXISTED IN CKT 39 AND HAS BEEN REPAIRED, CLEAR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."
- IF NO KNOWN FAULT EXISTED IN CKT 39, INSPECT CKT 688 BETWEEN RESISTOR MODULE AND DERM AND CKT 358 BETWEEN "INFLATABLE RESTRAINT" INDICATOR AND DERM FOR POOR CONNECTION, OPEN, SHORTS TO GROUND OR VOLTAGE. REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J-38125.
- CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- IS HISTORY CODE 35 SET?

NO

YES

⑤

- INSPECT CKT 349 FROM BASE OF STEERING COLUMN TO THE FORWARD DISCRIMINATING SENSOR AND CKT 1003 FROM PASSENGER COMPARTMENT AND FORWARD DISCRIMINATING SENSORS TO GROUND. AN INTERMITTENT OPEN IN ANY OF THESE CIRCUITS WILL CAUSE THIS CODE. ASSURE PROPER CONNECTIONS AT PASSENGER COMPARTMENT AND FORWARD DISCRIMINATING SENSORS. REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J-38125.
- CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- IS HISTORY CODE 23 SET?

NO

YES

- GO TO CHART A3

⑥

- INSPECT 36VLR CKT 238 FOR SHORTS TO CKT 347 OR 349. ASSURE PROPER CONNECTIONS AT THE ARMING AND FORWARD DISCRIMINATING SENSORS. INSPECT FOR CONNECTOR DAMAGE. REPAIR OR REPLACE AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J-38125.
- CLEAN SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

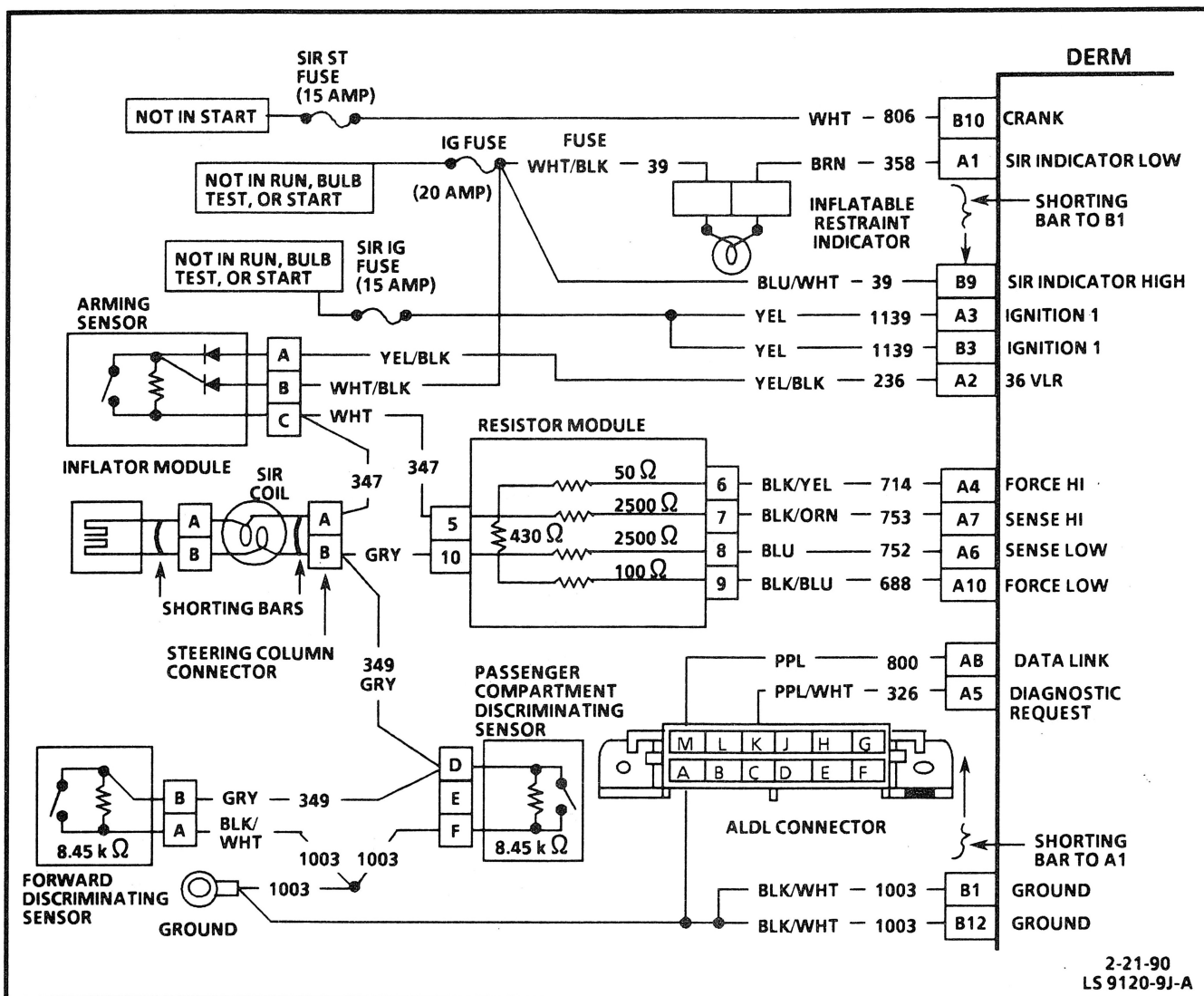


CHART A2

"SCAN" TOOL HISTORY CODE DIAGNOSIS

Description:

When the Ignition Switch is first turned "ON" system voltage is applied through IG FUSE to "SIR Indicator High" ("B9") and to the "INFLATABLE RESTRAINT" Indicator Lamp which is connected to "SIR Indicator Low" ("A1"). SIR FUSE also applies system voltage to the "Ignition 1" inputs ("A3" and "B3"). The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times.

Notes on Fault Tree:

1. Checks for intermittent shorts to system voltage in the 36VLR wiring (CKT 236).
2. Checks for intermittent shorts to ground in the 36VLR wiring (CKT 236).
3. Checks for intermittent open in the 36VLR wiring (CKT 236).
4. Checks for intermittent open in the Force Hi and Force Low wiring (CKT 714 and CKT 688).
5. Checks for intermittent opens or shorts to ground in the Sense Low wiring (CKT 752).
6. Checks for shorts to system voltage in the deployment loop (CKT 347 and CKT 349) or in the diagnostic circuits (CKT 347, CKT 688, CKT 714, CKT 752 and CKT 753).
7. Checks for shorts between CKT 236, CKT 347, or CKT 349.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART A2

"SCAN" TOOL HISTORY CODE DIAGNOSIS

CONTINUED FROM CHART A1

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

- ARE BOTH HISTORY CODES 33 AND 42 SET WITH ANY OF THE FOLLOWING?
A) NO OTHER CODES B) CODE 41 C) CODE 61

- NO — YES
- 1
- PROBLEM IS LIKELY TO BE AN INTERMITTENT SHORT TO SYSTEM VOLTAGE IN 38VLR CIRCUIT.
 - INSPECT WIRING BETWEEN DERM AND ARMING SENSOR. IF WIRING IS CUT, PINCHED OR SHORTED, REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J 38125.
 - CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- ARE BOTH HISTORY CODES 32 AND 42 SET WITH ANY OF THE FOLLOWING?
A) NO OTHER CODES B) CODE 41 C) CODE 61

- NO — YES
- 2
- PROBLEM IS LIKELY TO BE AN INTERMITTENT SHORT TO GROUND IN 36VLR CIRCUIT.
 - INSPECT WIRING BETWEEN DERM AND ARMING SENSOR. IF WIRING IS CUT, PINCHED OR SHORTED, REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J 38125.
 - CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- ARE BOTH HISTORY CODES 24 AND 31 SET WITH ANY OF THE FOLLOWING?
A) NO OTHER CODES B) CODE 61

- NO — YES
- 3
- PROBLEM IS LIKELY TO BE AN INTERMITTENT OPEN IN 36VLR CIRCUIT.
 - INSPECT WIRING BETWEEN DERM AND ARMING SENSOR. IF WIRING IS CUT, PINCHED OR SHORTED, REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J 38125.
 - CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- ARE BOTH HISTORY CODES 21 AND 22 SET?

- NO — YES
- 4
- INSPECT CKTs 714 AND 688 FOR INTERMITTENT OPEN BETWEEN DERM AND RESISTOR MODULE. REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J 38125. ASSURE PROPER CONNECTION AT DERM AND RESISTOR MODULE. CPAs CONNECTED (CONNECTOR LOCKS).
 - CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- ARE BOTH HISTORY CODES 24, 26 AND 34 SET?

- NO — YES
- 5
- INSPECT CKT 752 FOR OPENS OR SHORTS TO GROUND. REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J 38125.
 - CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- ARE BOTH HISTORY CODES 24 AND 34 SET?

- NO — YES
- 6
- INSPECT FOR SHORTS TO GROUND OR VOLTAGE ON CKTs 347, 349, 688, 714, 752 OR 753. REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J 38125.
 - CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- ARE BOTH HISTORY CODES 23 AND 34 SET?

- NO — YES
- 7
- INSPECT FOR SHORTS TO VOLTAGE ON CKTs 236 TO CKTs 347 OR 349.
 - CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

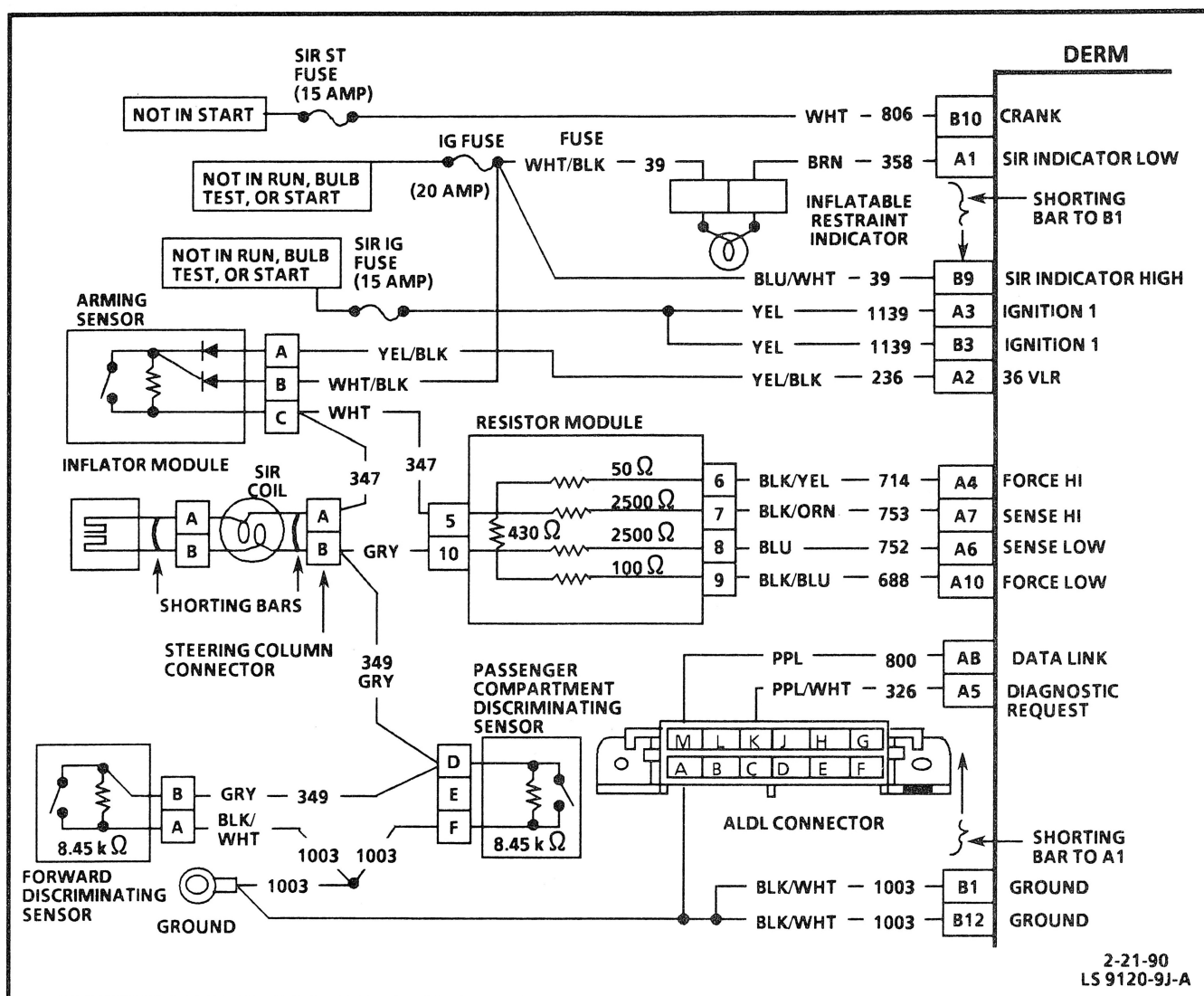


CHART A3
"SCAN" TOOL HISTORY CODE DIAGNOSIS

Description:

When the Ignition Switch is first turned "ON" system voltage is applied through IG FUSE to "SIR Indicator High" ("B9") and to the "INFLATABLE RESTRAINT" Indicator Lamp which is connected to "SIR Indicator Low" ("A1"). SIR FUSE also applies system voltage to the "Ignition 1" inputs ("A3" and "B3"). The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times.

Notes on Fault Tree:

1. Checks for intermittent opens in the 36VLR wiring (CKT 236).
2. Checks for intermittent open between 29 fuse and the Arming Sensor (CKT 39).

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART A3

"SCAN" TOOL HISTORY CODE DIAGNOSIS

CONTINUED FROM CHART A1

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

• IS HISTORY CODE 31 SET?

NO

YES

1

- INSPECT 36VLR CKT 236 BETWEEN DERM AND ARMING SENSOR FOR INTERMITTENT OPEN.
- ASSURE GOOD CONNECTION AT DERM AND ARMING SENSOR. ASSURE CPAs ARE INSTALLED (CONNECTOR LOCKS).
- REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN TOOL J 38125.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

• IS HISTORY CODE 34 SET?

NO

YES

2

- INSPECT CKT 39 BETWEEN FUSE AND ARMING SENSOR FOR INTERMITTENT OPEN.
- ASSURE GOOD CONNECTION AT ARMING SENSOR. ASSURE CPAs ARE INSTALLED (CONNECTOR LOCKS).
- REPAIR AS NEEDED FOLLOWING INSTRUCTIONS IN J 38125.
- CLEAR SIR CODES AND REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

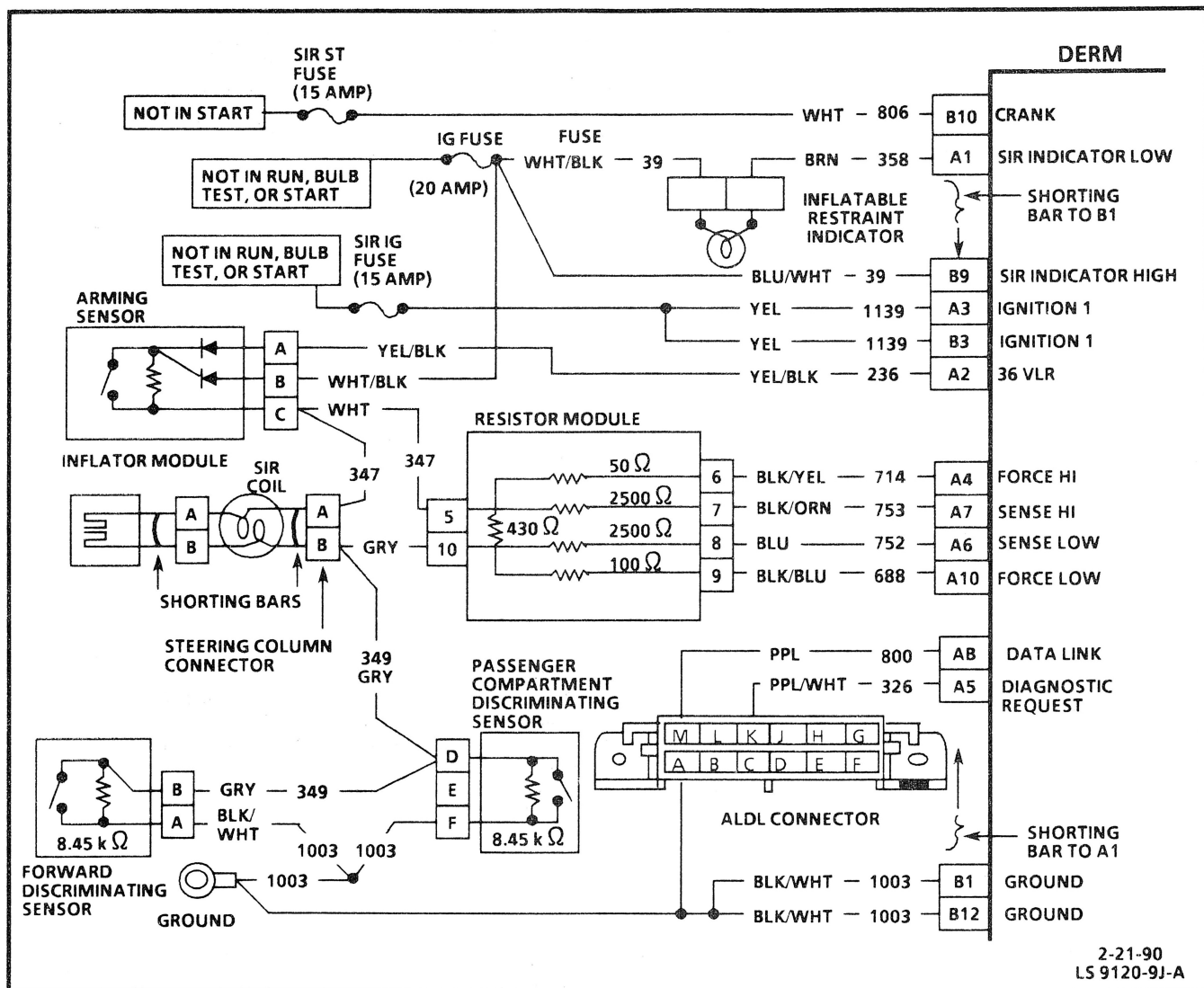


CHART B

"FLASH CODE" DIAGNOSIS

Description:

When the Ignition Switch is first turned "ON" system voltage is applied through IG FUSE to "SIR Indicator High" ("B9") and to the "INFLATABLE RESTRAINT" Indicator Lamp which is connected to "SIR Indicator Low" ("A1"). SIR FUSE also applies system voltage to the "Ignition 1" inputs ("A3" and "B3"). The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times.

Notes on Fault Tree:

1. If flash codes have been used to diagnose and repair a fault, the code(s) diagnosed and repaired will still appear as history codes only. The only way to clear history codes is with a "Scan" tool.
2. Where diagnostic charts request the clearing of SIR codes, the step is to be skipped since codes cannot be cleared through flash code diagnostics.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART B

"FLASH CODE" DIAGNOSIS

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

- IGNITION SWITCH "ON."
- JUMPER ALDL CONNECTOR TERMINAL "A" TO TERMINAL "K."
- RECORD ALL FLASHED CODES ONTO REPAIR ORDER.

CODE 12 WAS FLASHED

- IS CODE 13 THE ONLY OTHER CODE?

NO

YES

1

- NO CURRENT FAULTS EXIST
- IF A FLASH CODE DIAGNOSIS HAS BEEN PERFORMED, THE FAULT HAS BEEN REPAIRED. INSTRUCT OWNER THAT HISTORY CODES EXIST WHICH SHOULD BE CLEARED WHEN A "SCAN" TOOL BECOMES AVAILABLE OR WHEN THEY ARE NEXT AT A GM DEALER
- IF YOU ARE ATTEMPTING DIAGNOSIS AN INTERMITTENT CONDITION, REFER TO CHART A1

2

- IF A CODE 51 IS SET, GO TO CODE 51 CHART
- IF A CODE 52 IS SET, GO TO CODE 52 CHART
- IF A CODE 71 IS SET, GO TO CODE 71 CHART
- IF BOTH CODES 21 AND 22 ARE SET, GO TO CODE 21 AND 22 CHART
- THE FOLLOWING CHARTS WILL REQUEST THAT SIR CODES BE CLEARED, THIS CANNOT BE DONE WITHOUT A "SCAN" TOOL. THEREFORE, SKIP THIS ONE STEP AND CONTINUE WITH REMAINDER OF CHART
- DIAGNOSE REMAINING CODES FROM LOWEST TO HIGHEST STARTING AT FIRST CODE GREATER THAN 13

CODE 12 WAS NOT FLASHED

- REMOVE JUMPER
- MEASURE VOLTAGE FROM ALDL CONNECTOR TERMINAL "A" TO TERMINAL "K"

BELOW 4 VOLTS

- REPAIR OPEN IN "DIAGNOSTIC REQUEST" CIRCUIT
- RETURN TO TOP OF THIS CHART

4 TO 5.5 VOLTS

- REINSTALL JUMPER BETWEEN TERMINALS "A" AND "K" OF ALDL CONNECTOR
- IF CODE 12 IS DISPLAYED, RETURN TO TOP OF THIS CHART
- IF CODE 12 IS NOT DISPLAYED, REPLACE DERM, REFER TO 9J-B
- RETURN TO "SIR DIAGNOSTIC SYSTEM CHECK"

ABOVE 5.5 VOLTS

- REPAIR SHORT TO VOLTAGE IN "DIAGNOSTIC REQUEST" CIRCUIT
- RETURN TO TOP OF THIS CHART

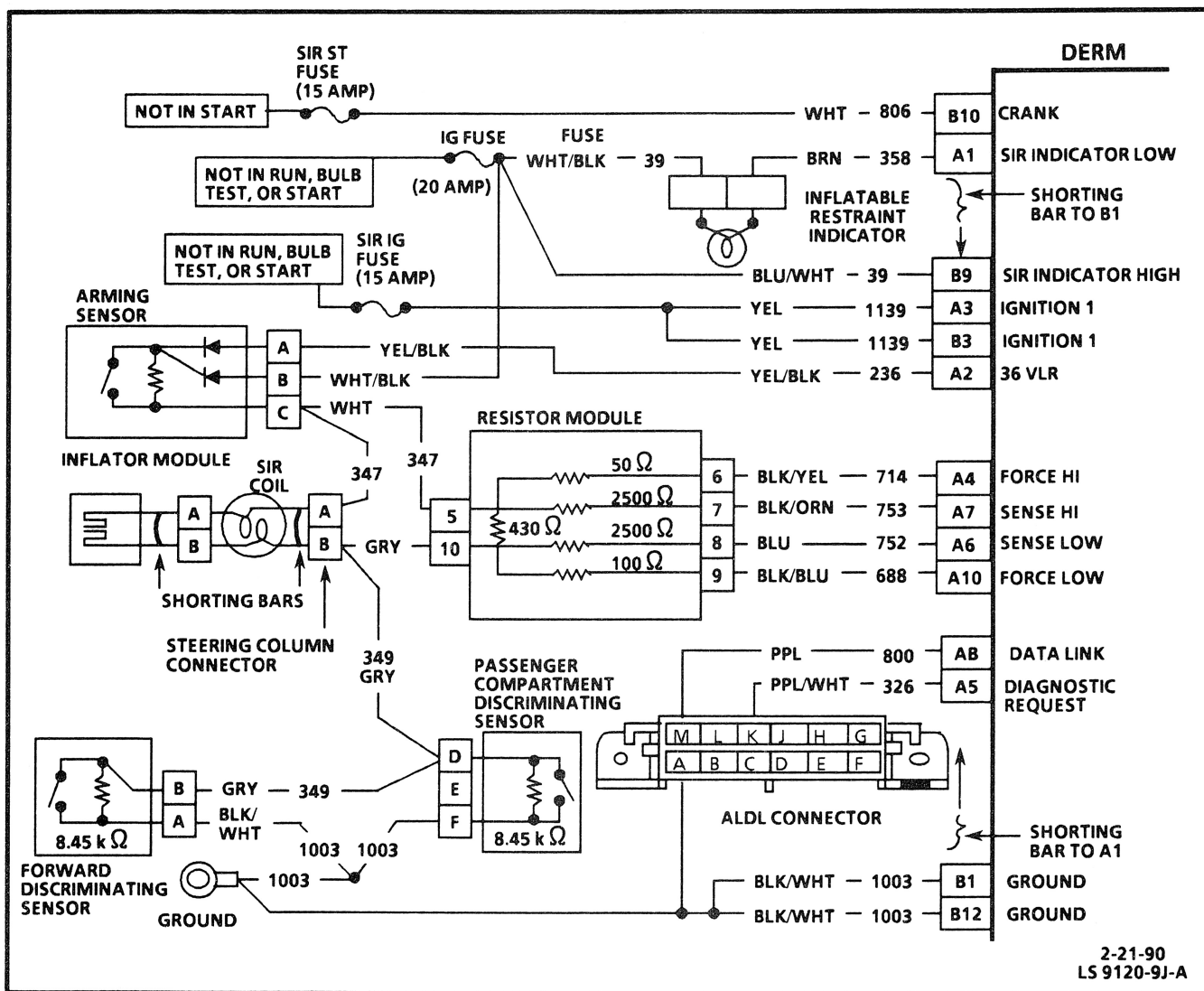


CHART C

"INFLATABLE RESTRAINT" INDICATOR COMES ON STEADY

Description:

When the Ignition Switch is first turned "ON" system voltage is applied through the IG FUSE to "SIR Indicator Low" ("A1"). SIR FUSE also applies system voltage to the "Ignition 1" inputs ("A3" and "B3"). The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

The purpose of the Shorting Bar is to turn the "INFLATABLE RESTRAINT" Indicator Lamp "ON" should the DERM become disconnected.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times.

Notes on Fault Tree:

1. An open SIR fuse would result in a loss of "Ignition 1" voltage at the DERM. The DERM grounding

the lamp circuit ("SIR Indicator Low") whenever the Ignition Switch is "ON."

2. If the DERM and the SIR harness connector are disconnected the Shorting Bar between terminals "A1" and "B1" of the harness connector will ground the lamp circuit.
3. Checks for a short to ground in the "Ignition 1" circuits or the DERM.
4. Checks if there is a short to ground on the low side of the lamp circuit external of the DERM. The SIR Load Tool prevents the Shorting Bar in the DERM connector from grounding the lamp circuit.
5. Checks if short to ground is in the DERM or the "Ignition 1" circuits.
6. Checks for "Ignition 1" voltage at the DERM. If the "Ignition 1" circuits are open the DERM will ground the lamp circuit whenever the Ignition Switch is "ON" (if the "SIR Indicator High" circuit is good).
7. Checks for a short to system voltage in the "CRANK" circuit.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART C

"INFLATABLE RESTRAINT" INDICATOR COMES ON STEADY

• WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 340294 DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

- 1
- IGNITION SWITCH "OFF."
 - CHECK SIR FUSE.

FUSE OK

- 2
- CHECK THAT DERM CONNECTOR IS SECURELY CONNECTED TO THE DERM.

GOOD CONNECTION

- 4
- IGNITION SWITCH "OFF."
 - DISCONNECT DERM.
 - INSTALL DERM CONNECTOR OF SIR LOAD TESTER J 37808 ON HARNESS CONNECTOR.
 - IGNITION SWITCH "ON."
 - OBSERVE "INFLATABLE RESTRAINT" INDICATOR.

INDICATOR "OFF"

- 6
- IGNITION SWITCH "ON."
 - MEASURE VOLTAGE FROM DERM HARNESS CONNECTOR TERMINAL "A3" AND "B3" TO GROUND.

SYSTEM VOLTAGE AT BOTH TERMINALS

- 7
- IGNITION SWITCH "ON."
 - MEASURE VOLTAGE FROM DERM HARNESS CONNECTOR TERMINAL "B10" TO GROUND.

LESS THAN SYSTEM VOLTAGE

- REPLACE DERM.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

POOR CONNECTION

- SECURE HARNESS CONNECTION.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

INDICATOR "ON"

- REPAIR SHORT TO GROUND IN CKT 358 AND CHECK THE SHORTING BAR ON THE DERM CONNECTOR.
- RECONNECT DERM.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

FUSE OPEN

- 3
- IGNITION SWITCH "OFF."
 - REPLACE SIR FUSE.
 - IGNITION SWITCH "ON."
 - CHECK SIR FUSE

FUSE OPEN

- 5
- IGNITION SWITCH "OFF."
 - DISCONNECT DERM.
 - REMOVE SIR FUSE.
 - IGNITION SWITCH "ON."
 - MEASURE VOLTAGE ACROSS SIR FUSE TERMINALS.

SYSTEM VOLTAGE

- REPAIR SHORT TO GROUND IN THE IGNITION CKT 1139.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

FUSE OK

- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

LESS THAN SYSTEM VOLTAGE

- REPLACE DERM.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

LESS THAN SYSTEM VOLTAGE AT ONE OR BOTH TERMINALS

- REPAIR OPEN IN THE IGNITION CKT 1139 BETWEEN FUSE AND DERM.
- RECONNECT DERM.
- CLEAR SIR CODES
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

SYSTEM VOLTAGE

- REPAIR SHORT TO VOLTAGE IN THE "CRANK" CKT 806 BETWEEN NSSS AND DERM.
- RECONNECT DERM.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

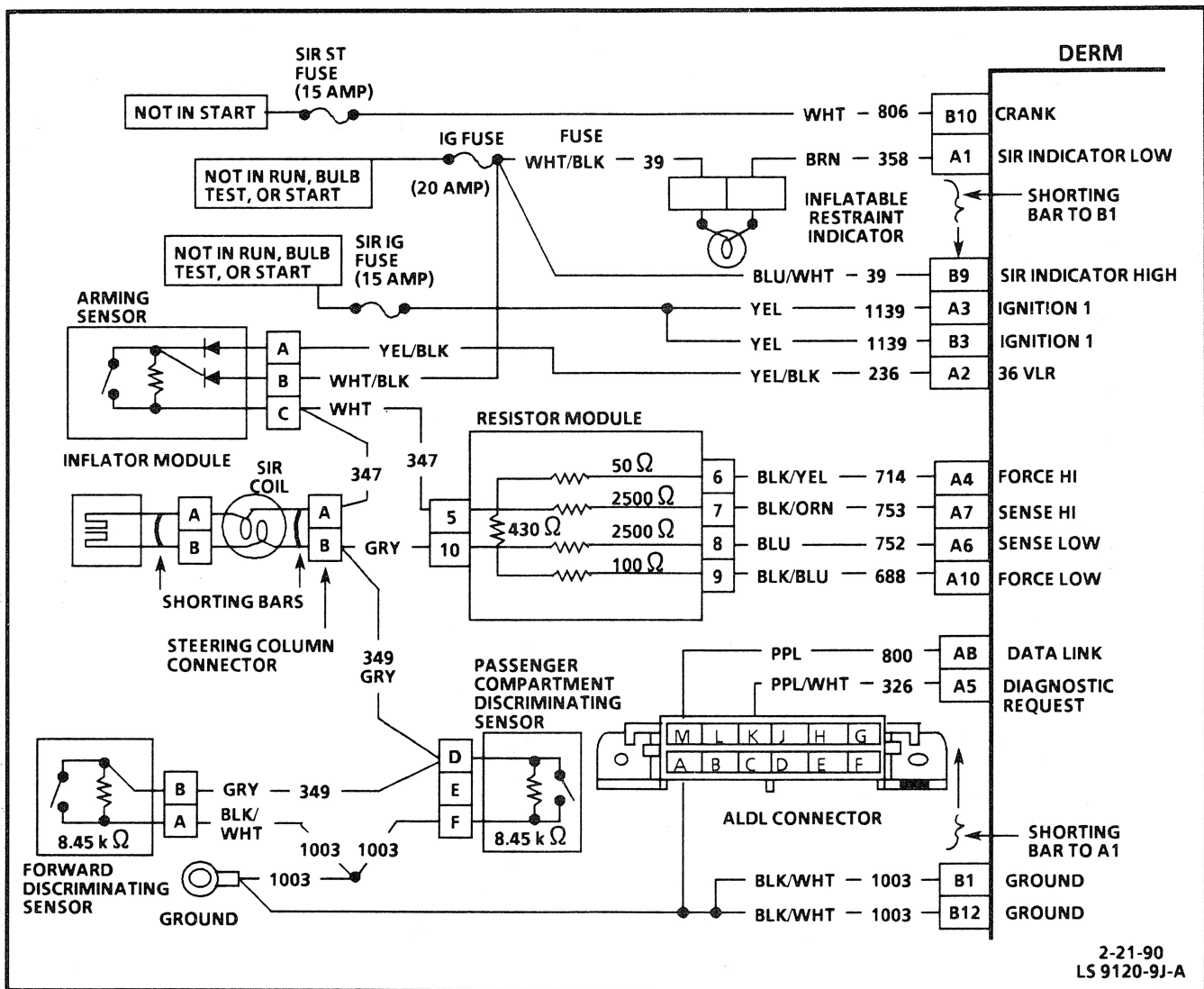


CHART D

"INFLATABLE RESTRAINT" INDICATOR DOES NOT COME ON

Description:

When the Ignition Switch is first turned "ON" system voltage is applied through the SIR FUSE and IG FUSE to the DERM at the "SIR Indicator Low," "SIR Indicator High" and the "Ignition 1" inputs. The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times with a lamp driver at the "SIR Indicator Low" input.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times if the Ignition Switch is "ON."

Notes on Fault Tree:

1. Checks high side (power side) of the lamp circuit is good.

This circuit powers a number of indicators within the indicators cluster (such as the "Service Engine Soon" and "Oil" indicators). If these other indicators are operative, then the power supply to the "Inflatable Restraint" indicator is not suspect.

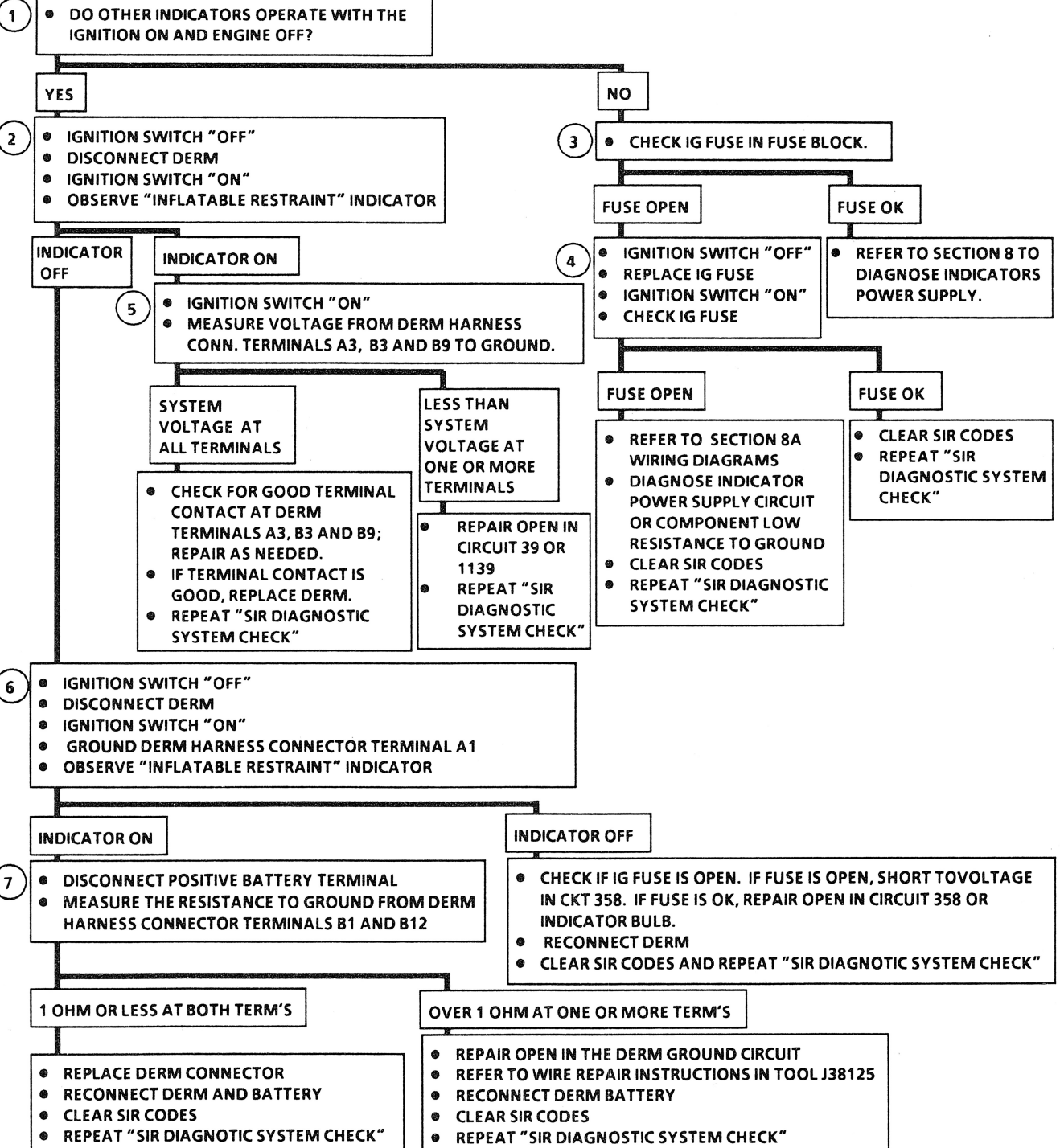
2. When the DERM is disconnected the Shorting Bar between terminals "A1" and "B1" of the DERM harness connector should ground the lamp circuit. If the indicator does not come on the ground circuits. Indicator circuit or the Shorting Bar are suspect. If the indicator comes on the DERM or the "SIR Indicator High" and the "Ignition 1" circuits are suspect.
3. Checks IG Fuse which is in the high side (power side) of the lamp circuit.
4. Checks for a short to ground in IG Fuse circuits.
5. Checks for system voltage at the "Ignition 1" and "SIR Indicator High" inputs at the DERM.
6. Checks if the lamp circuit external to the DERM is good.
7. Checks if the ground circuits to the DERM are good.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT. SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART D

"INFLATABLE RESTRAINT" INDICATOR DOES NOT COME ON

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J-34029A DVOM WITH THE CORRECT PROBE FROM J-35616. SEE "CAUTION" ABOVE.



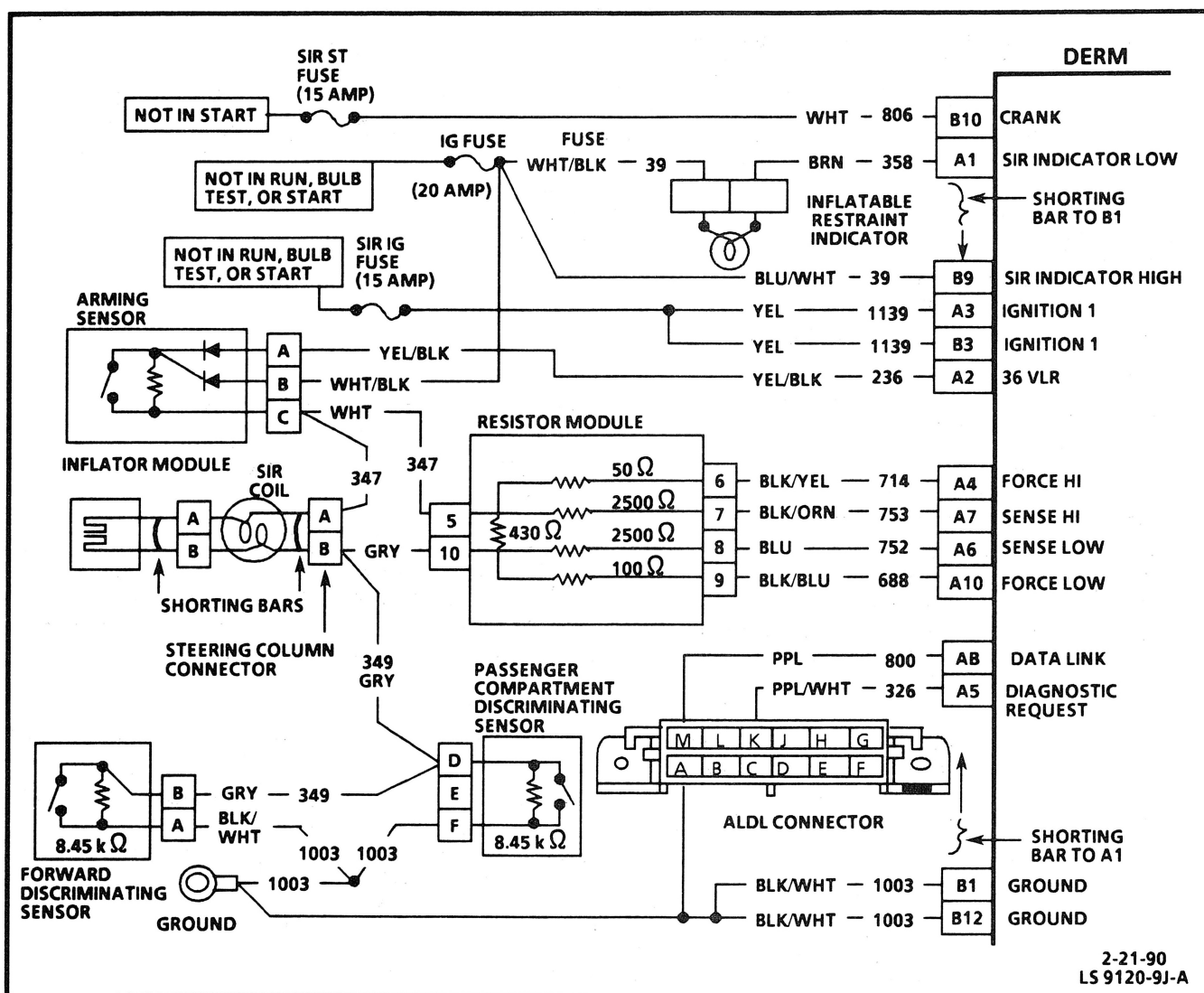


CHART E

"INFLATABLE RESTRAINT" INDICATOR DOES NOT COME ON STEADY DURING CRANK

Description:

When the Ignition Switch is first turned "ON" system voltage is applied through IG FUSE to "SIR Indicator High" ("B9") and to the "INFLATABLE RESTRAINT" Indicator Lamp which is connected to "SIR Indicator Low" ("A1"). SIR FUSE also applies system voltage to the "Ignition 1" inputs ("A3" and "B3"). The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times if the Ignition Switch is "ON."

Notes on Fault Tree:

1. Checks for system voltage at the "CRANK" input of the DERM during cranking.
2. Checks for the "CRANK" circuit for an open or high resistance.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT. SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART E

"INFLATABLE RESTRAINT" INDICATOR DOES NOT COME ON STEADY DURING CRANK

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J34029A DVOM WITH THE CORRECT PROBE FROM J35616. SEE "CAUTION" ABOVE.

- 1
- BACKPROBE DERM CONNECTOR TERMINAL B10
 - MEASURE THE VOLTAGE TO GROUND WHILE CRANKING

LESS THAN CRANKING VOLTAGE

CRANKING VOLTAGE

- 2
- IGNITION SWITCH "OFF"
 - DISCONNECT DERM
 - MEASURE THE RESISTANCE TO GROUND FROM TERMINAL B10 OF THE DERM HARNESS CONNECTOR

- CHECK FOR GOOD TERMINAL CONTACT AT DERM TERMINAL B10, REPAIR AS NEEDED.
- REFER TO WIRE REPAIR INSTRUCTIONS IN TOOL J38125
- IF TERMINAL CONTACT IS GOOD, REPLACE DERM.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK"

10 OHMS OR LESS

OVER 10 OHMS

- REPLACE DERM
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK"

- REPAIR OPEN OR HIGH RESISTANCE IN CIRCUIT 806
- REFER TO WIRE REPAIR INSTRUCTIONS IN TOOL J38125
- RECONNECT DERM
- CLEAR SIR CODES
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK"

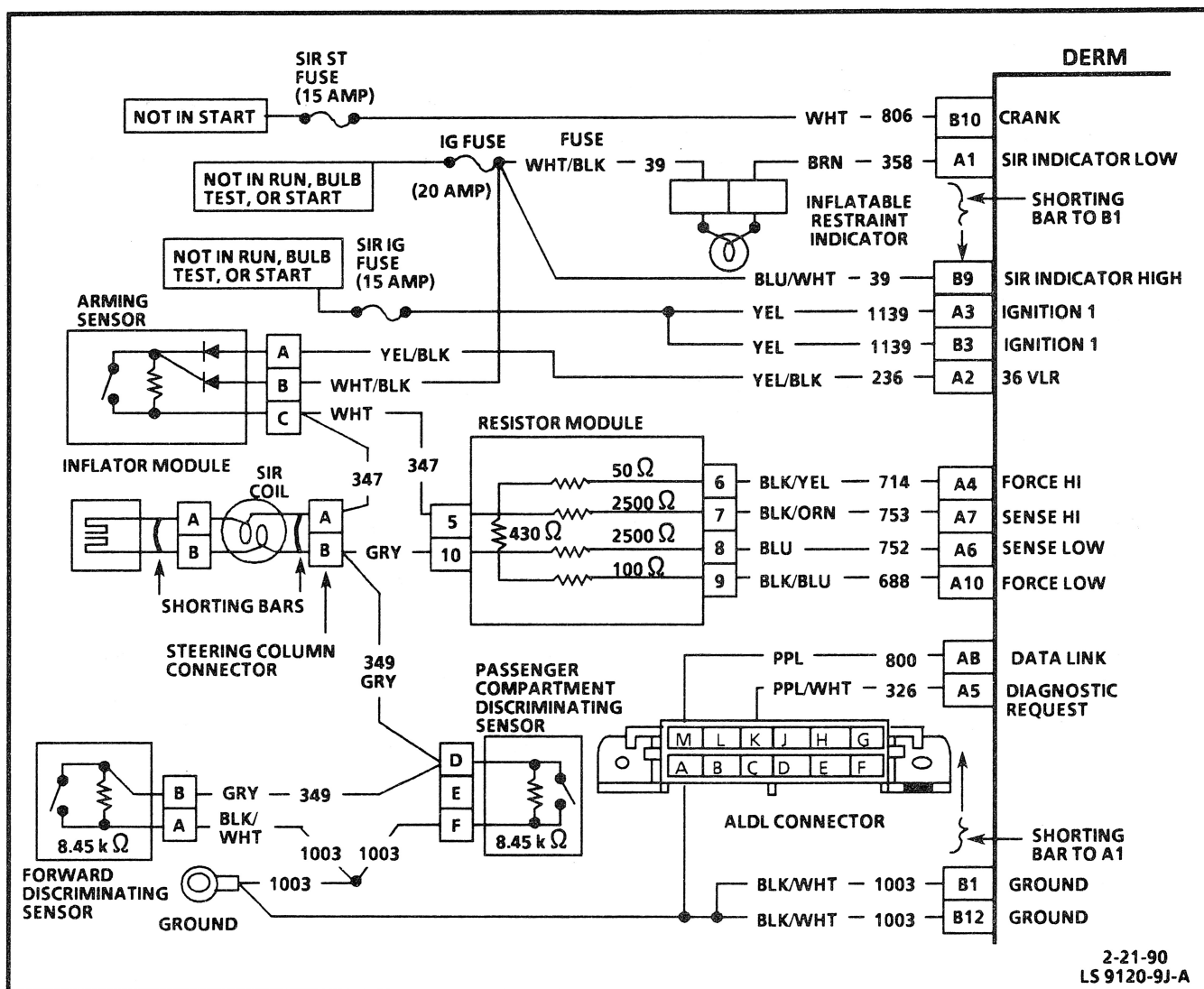


CHART F

"INFLATABLE RESTRAINT" INDICATOR BLINKS 7 TIMES AND THEN FLASHES CODE 12

Description:

When the Ignition Switch is first turned "ON" system voltage is applied through IG FUSE to "SIR Indicator High" ("B9") and to the "INFLATABLE RESTRAINT" Indicator Lamp which is connected to "SIR Indicator Low" ("A1"). SIR FUSE also applies system voltage to the "Ignition 1" inputs ("A3" and "B3"). The DERM responds by blinking the "INFLATABLE RESTRAINT" indicator 7 times.

When the engine is being cranked system voltage is applied to the DERM at the "CRANK" input. The DERM grounds the lamp circuit until system voltage is removed from the "CRANK" input. This results in a steady "INFLATABLE RESTRAINT" indicator during cranking.

After cranking the DERM will again blink the "INFLATABLE RESTRAINT" indicator 7 times if the Ignition Switch is "ON."

Notes on Fault Tree:

1. Checks the "Diagnostic Request" circuit for voltage at the ALDL connector.
2. Checks if short to ground is in the "Diagnostic Request" circuit or the DERM.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT. SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CHART F

"INFLATABLE RESTRAINT" INDICATOR BLINKS 7 TIMES AND THEN FLASHES CODE 12

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J-34029A DVOM WITH THE CORRECT PROBE FROM J-35616. SEE "CAUTION" ABOVE.

- 1
- IGNITION SWITCH AT "RUN"
 - MEASURE THE VOLTAGE TO GROUND FROM TERMINAL K OF THE ALDL CONNECTOR

4 VOLTS OF LESS

OVER 4 VOLTS

- 2
- IGNITION SWITCH "OFF"
 - DISCONNECT DERM
 - MEASURE THE RESISTANCE TO GROUND FROM TERMINAL K OF THE ALDL CONNECTOR

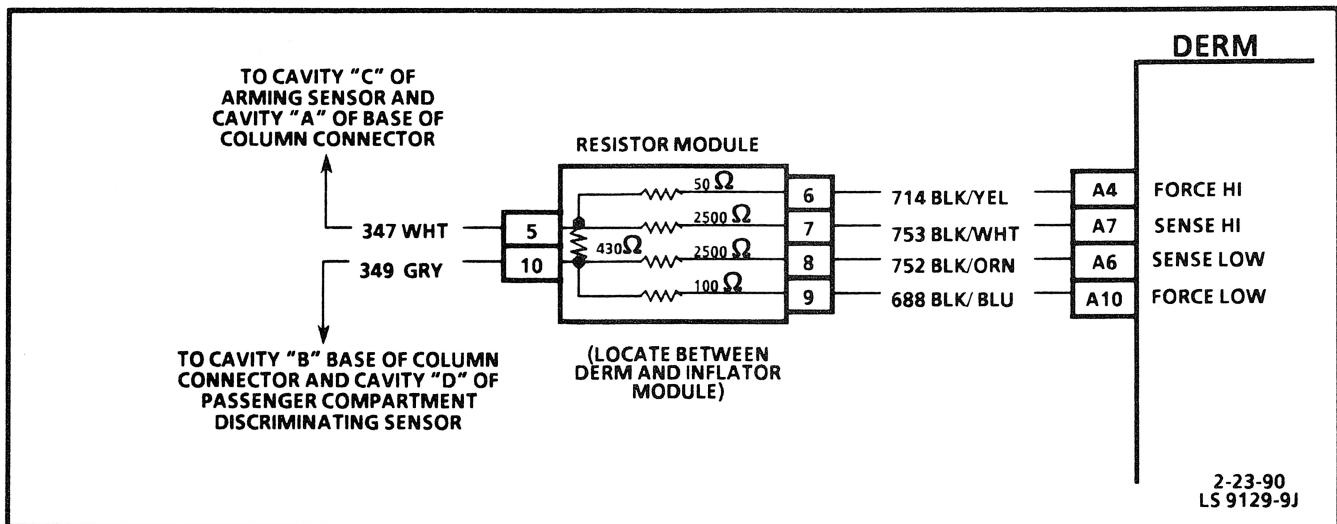
- REPLACE DERM
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK"

10 OHMS OR LESS

OVER 10 OHMS

- REPAIR SHORT TO GROUND IN "DIAGNOSTIC REQUEST" CIRCUIT 326 BETWEEN DERM AND ALDL CONNECTOR
- REFER TO WIRE REPAIR INSTRUCTIONS IN TOOL J38125
- CLEAR SIR CODES
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK"

- REPLACE DERM
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK"



CODE 21 CHART 1

STEERING COLUMN RESISTANCE TOO HIGH

Description:

The DERM injects a current of 75 milliamperes through the steering column from the Force Hi output (terminal "A4") to the Force Low input (terminal "A10"). By monitoring the voltage at the Sense Hi input (terminal "A7") and the Sense Low input (terminal "A6") the DERM calculates the combined resistance of the Inflator Module, SIR Coil, harness wiring (CKT 347 and CKT 349) and connector terminal contact in the steering column. Code 21 will set if the resistance is greater than a specified value or the 100 ohm resistors within the Resistor Module is shorted.

Test Conditions:

Tested once each ignition cycle during the "Steering Column Resistance Test" if: 1) No faults are detected during "Turn-On;" 2) No faults are detected during "Continuous Monitoring" for 1 second; 3) No Crank signal present.

Failure Conditions:

Code 21 will set if the combined resistance of the Inflator Module, SIR Coil, harness wiring and connector terminal contact in the steering column is greater than a specified value.

Conditions To Clear:

Current Code 21 will be cleared each time the Ignition Switch is turned "OFF."

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

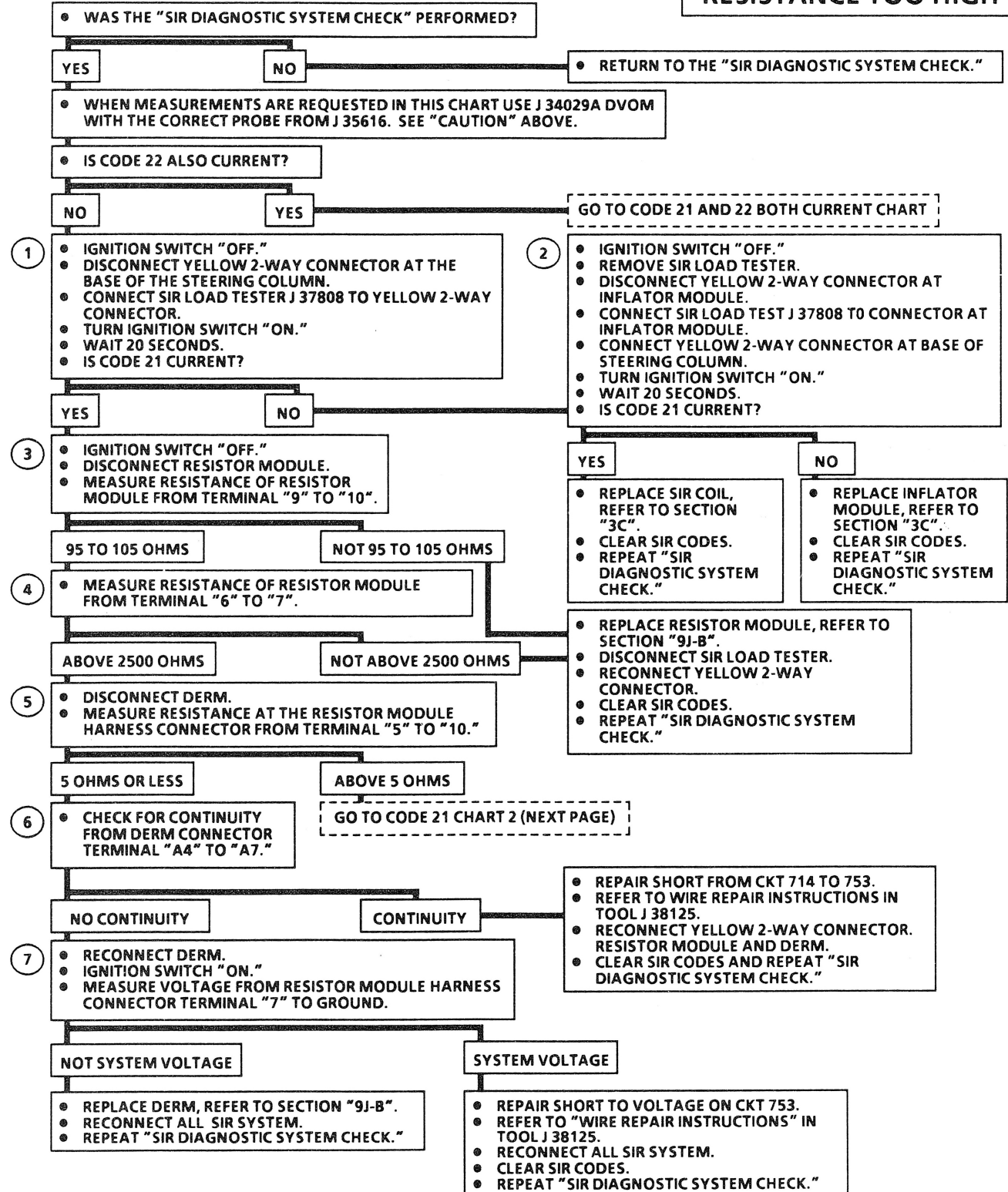
Notes on Fault Tree:

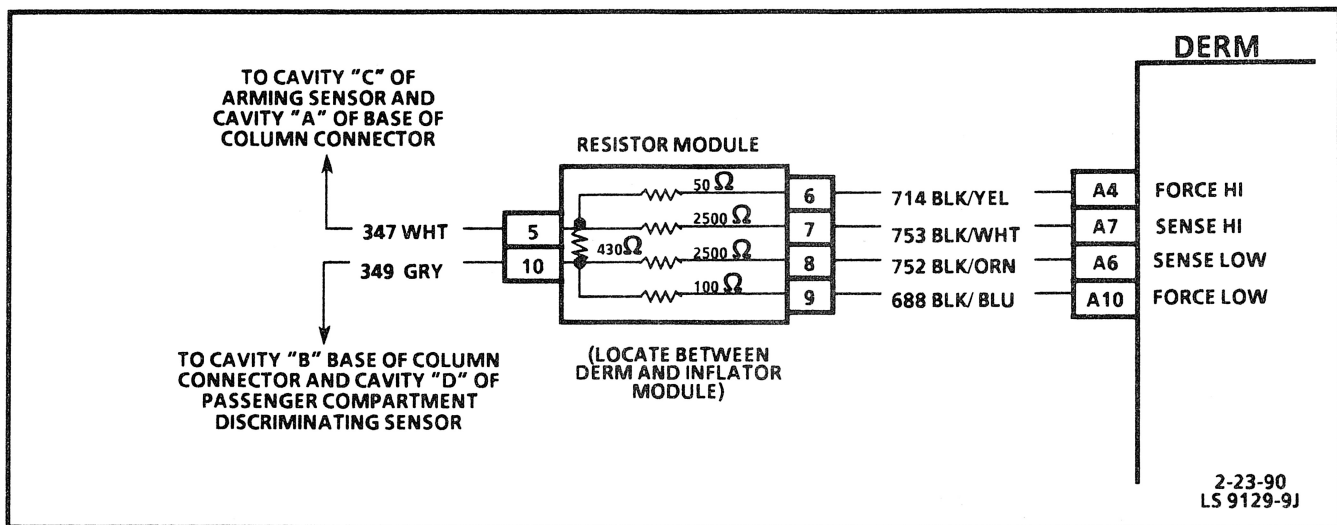
1. Checks if fault is in steering column. The SIR Load Tester simulates the resistance of good steering column wiring and components.
2. Determines if fault is in Inflator Module or in the SIR Coil. The SIR Load Tester simulates the resistance of a good Inflator Module.
3. Checks if 100 ohm resistor in the Resistor Module is shorted.
4. Checks the Resistor Module for internal shorts.
5. Checks the resistance of circuits between the Resistor Module and the DERM.
6. Checks for harness shorts between Force Hi and Sense Hi.
7. Checks for Sense Hi shorted to voltage.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 21 CHART 1

STEERING COLUMN RESISTANCE TOO HIGH





CODE 21 CHART 2

STEERING COLUMN RESISTANCE TOO HIGH

Description:

The DERM injects a current of 75 milliamperes through the steering column from the Force Hi output (terminal "A4") to the Force Low input (terminal "A10"). By monitoring the voltage at the Sense Hi input (terminal "A7") and the Sense Low input (terminal "A6") the DERM calculates the combined resistance of the Inflator Module, SIR Coil, harness wiring (CKT 347 and CKT 349) and connector terminal contact in the steering column. Code 21 will set if the resistance is greater than a specified value or the 100 ohm resistors within the Resistor Module is shorted.

Test Conditions:

Tested once each ignition cycle during the "Steering Column Resistance Test" if: 1) No faults are detected during "Turn-On;" 2) No faults are detected during "Continuous Monitoring" for 1 second; 3) No Crank signal present.

Failure Conditions:

Code 21 will set if the combined resistance of the Inflator Module, SIR Coil, harness wiring and connector terminal contact in the steering column is greater than a specified value.

Conditions To Clear:

Current Code 21 will be cleared each time the Ignition Switch is turned "OFF."

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

Notes on Fault Tree:

1. Checks for an open in CKT 347 between the Resistor Module and the Arming Sensor.
2. Checks for an open in CKT 349 between the Resistor Module and the Steering Column Connector.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 21 CHART 2

STEERING COLUMN RESISTANCE TOO HIGH

- WERE YOU SENT HERE FROM CODE 21 CHART 1?
- RETURN TO CODE 21 CHART 1

YES

NO

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

RETURN TO CODE 21 CHART 1

1

- SIR LOAD TOOL STILL CONNECTED.
- DISCONNECT PASSENGER COMPARTMENT DISCRIMINATING SENSOR.
- DISCONNECT DERM AND ARMING SENSOR.
- DISCONNECT SIR LOAD TESTER.
- CHECK FOR CONTINUITY FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "5" TO ARMING SENSOR HARNESS CONNECTOR TERMINAL "C".

CONTINUITY

NO CONTINUITY

2

- CHECK FOR CONTINUITY FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "5" TO YELLOW 2-WAY CONNECTOR TERMINAL "A" AT BASE OF STEERING COLUMN.

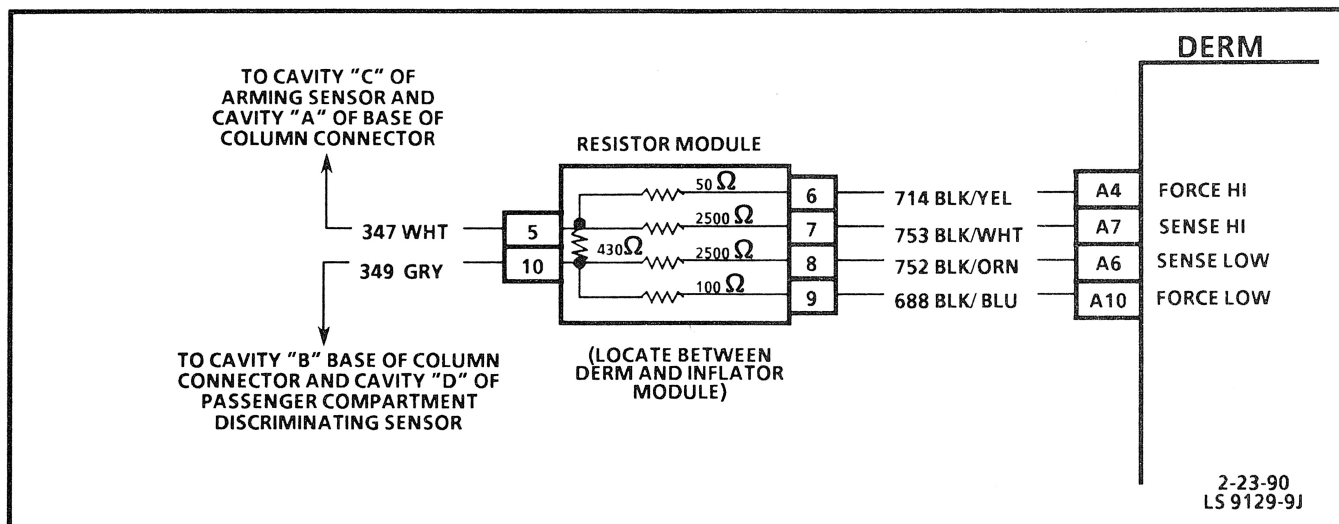
- REPAIR OPEN IN CKT 347 BETWEEN RESISTOR MODULE AND ARMING SENSOR.
- REFER TO "WIRE REPAIR INSTRUCTIONS" IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR ARMING AND PASSENGER COMPARTMENT DISCRIMINATING SENSORS, DERM AND RESISTOR MODULE.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

CONTINUITY

NO CONTINUITY

- REPAIR OPEN IN CKT 349 BETWEEN RESISTOR MODULE AND YELLOW 2-WAY CONNECTOR.
- REFER TO "WIRE REPAIR INSTRUCTIONS" IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR, ARMING AND PASSENGER COMPARTMENT DISCRIMINATING SENSORS, DERM AND RESISTOR MODULE.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- REPAIR OPEN IN CKT 347 BETWEEN RESISTOR MODULE AND YELLOW 2-WAY CONNECTOR.
- REFER TO "WIRE REPAIR INSTRUCTIONS" IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR, ARMING AND PASSENGER COMPARTMENT DISCRIMINATING SENSORS, DERM AND RESISTOR MODULE.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."



CURRENT CODE 22 CHART 1

STEERING COLUMN RESISTANCE TOO LOW

Description:

The DERM injects a current of 75 milliamperes through the steering column from the Force Hi output (terminal "A4") to the Force Low input (terminal "A10"). By monitoring the voltage at the Sense Hi input (terminal "A7") and the Sense Low input (terminal "A6") the DERM calculates the combined resistance of the Inflator Module, SIR Coil, harness wiring (CKT 347 and CKT 349) and connector terminal contact in the steering column. Code 22 will set if:

- The steering column resistance is less than a specified value.
- The 430 ohm resistor in the Resistor Module is shorted.
- The resistance of the 100 ohm resistor in the Resistor Module is too high.
- The high side of the deployment loop is shorted to the low side of the deployment loop.

Test Conditions:

Tested once each ignition cycle during the "Steering Column Resistance Test" if: 1) No faults are detected during "Turn-On;" 2) No faults are detected during "Continuous Monitoring" for 1 second; 3) No Crank signal present.

Failure Conditions:

Code 22 will set if the combined resistance of the Inflator Module, SIR Coil, harness wiring and connector terminal contact in the steering column is less than a specified value.

Conditions To Clear:

Current Code 22 will be cleared each time the Ignition Switch is turned "OFF."

Action Taken:

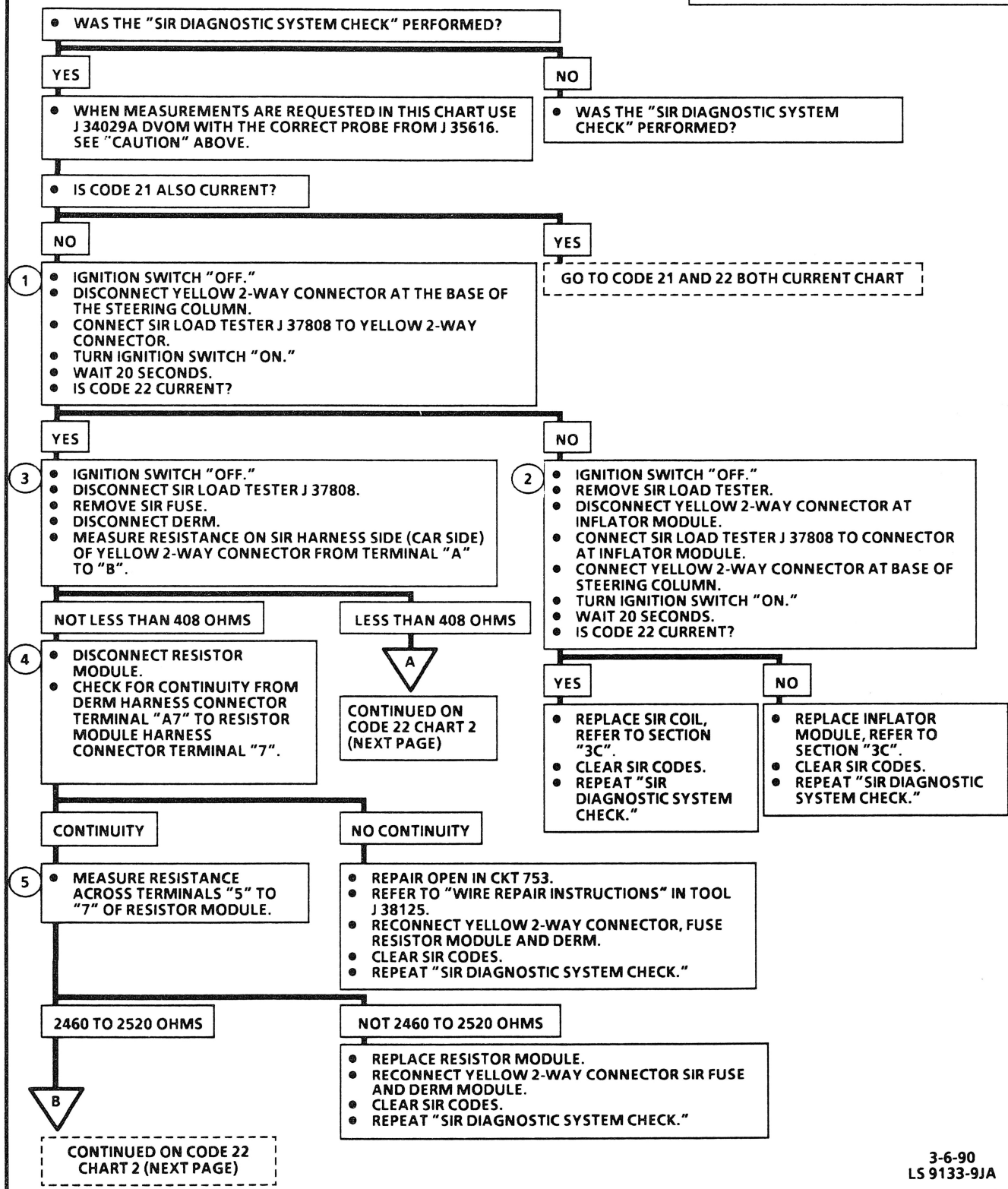
DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

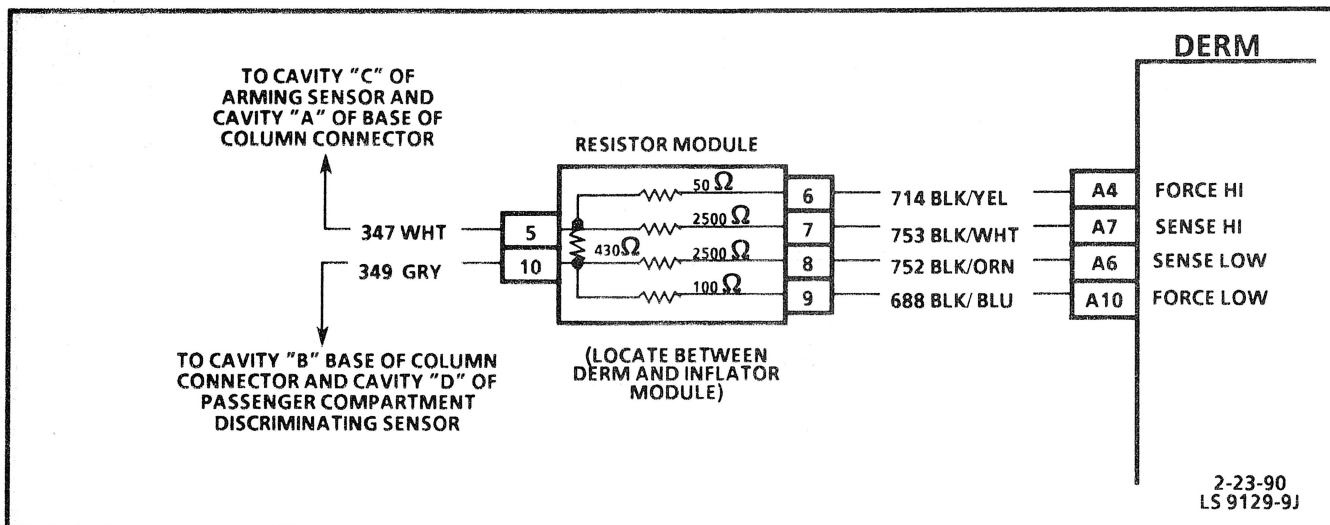
Notes on Fault Tree:

1. Checks if fault is in steering column. The SIR Load Tester J 37808 simulates the resistance of good steering column wiring and components.
2. Determines if fault is in Inflator Module or in the SIR Coil. The SIR Load Tester J 37808 simulates the resistance of a good Inflator Module.
3. Determines if fault is on deployment loop side or DERM side of resistor module.
4. Checks for open in Sense Hi (CKT 753).
5. Checks for an open or shorted Resistor Module.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CURRENT CODE 22 CHART 1 STEERING COLUMN RESISTANCE TOO LOW





CURRENT CODE 22 CHART 2

STEERING COLUMN RESISTANCE TOO LOW

Description:

The DERM injects a current of 75 milliamperes through the steering column from the Force Hi output (terminal "A4") to the Force Low input (terminal "A10"). By monitoring the voltage at the Sense Hi input (terminal "A7") and the Sense Low input (terminal "A6") the DERM calculates the combined resistance of the Inflator Module, SIR Coil, harness wiring (CKT 347 and CKT 349) and connector terminal contact in the steering column. Code 22 will set if:

- The steering column resistance is less than a specified value ohms.
- The 430 ohm resistor in the Resistor Module is shorted.
- The resistance of the 100 ohm resistor in the Resistor Module is too high.
- The high side of the deployment loop is shorted to the low side of the deployment loop.

Test Conditions:

Tested once each ignition cycle during the "Steering Column Resistance Test" if: 1) No faults are detected during "Turn-On;" 2) No faults are detected during "Continuous Monitoring" for 1 second; 3) No Crank signal present.

Failure Conditions:

Code 22 will set if the combined resistance of the Inflator Module, SIR Coil, harness wiring and connector terminal contact in the steering column is less than a specified value ohms.

Conditions To Clear:

Current Code 22 will be cleared each time the Ignition Switch is turned "OFF."

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

Notes on Fault Tree:

1. Determines if a short exists in wiring from resistor module to steering column or from resistor module to DERM.
2. Determines if resistor module is defective or if Sense Hi wiring is shorted to Sense Low wiring.
3. Checks for short between Sense Hi and Data line.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 23 STEERING COLUMN VOLTAGE TOO HIGH

• WAS THE "SIR DIAGNOSTIC SYSTEM CHECK" PERFORMED?

YES

NO

• RETURN TO THE "SIR DIAGNOSTIC SYSTEM CHECK."

• WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

1

- IGNITION SWITCH "OFF."
- DISCONNECT YELLOW 2-WAY CONNECTOR AT THE BASE OF THE STEERING COLUMN.
- CONNECT SIR LOAD TESTER J 37808 TO YELLOW 2-WAY CONNECTOR.
- DISCONNECT RESISTOR MODULE AND THE ARMING SENSOR.
- IGNITION SWITCH "ON."
- MEASURE VOLTAGE FROM TERMINAL "C" OF THE ARMING SENSOR HARNESS CONNECTOR TO GROUND.

LESS THAN 1 VOLT

NOT LESS THAN 1 VOLT

2

- IGNITION SWITCH "OFF."
- DISCONNECT PASSENGER COMPARTMENT DISCRIMINATING SENSOR AND SIR LOAD TESTER.
- CHECK FOR CONTINUITY FROM 2-WAY CONNECTOR TERMINAL "B" TO PASSENGER COMPARTMENT DISCRIMINATING SENSOR HARNESS CONNECTOR TERMINAL "D".

- DISCONNECT SIR LOAD TESTER.
- MEASURE VOLTAGE BETWEEN ARMING SENSOR HARNESS CONNECTOR TERMINAL "A" AND STEERING COLUMN HARNESS CONNECTOR TERMINAL "B".

30 VOLTS OR MORE

LESS THAN 30 VOLTS

- REPAIR SHORT FROM 36VLR CKT 236 TO CKT 347.
- REFER TO WIRE REPAIR INSTRUCTIONS IN TOOL J 38125.
- RECONNECT ARMING SENSOR AND YELLOW 2-WAY.
- CLEAR SIR CODES.
- KEY "OFF" FOR 10 MINUTES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- REPAIR SHORT FROM 36VLR CKT 236 TO CKT 349.
- REFER TO WIRE REPAIR INSTRUCTIONS IN TOOL J 38125.
- RECONNECT ARMING SENSOR AND YELLOW 2-WAY.
- CLEAR SIR CODES.
- KEY "OFF" FOR 10 MINUTES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

CONTINUITY

NO CONTINUITY

3

- CHECK FOR CONTINUITY FROM PASSENGER COMPARTMENT DISCRIMINATING SENSOR HARNESS CONNECTOR TERMINAL "F" TO GROUND.

- REPAIR OPEN IN CKT 349.
- REFER TO WIRE REPAIR INSTRUCTIONS IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR ARMING AND PASSENGER COMPARTMENT DISCRIMINATING SENSORS AND RESISTOR MODULE.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

CONTINUITY

NO CONTINUITY

4

- RECONNECT SIR LOAD TESTER AND ARMING SENSOR.
- MEASURE VOLTAGE FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "5" TO GROUND.

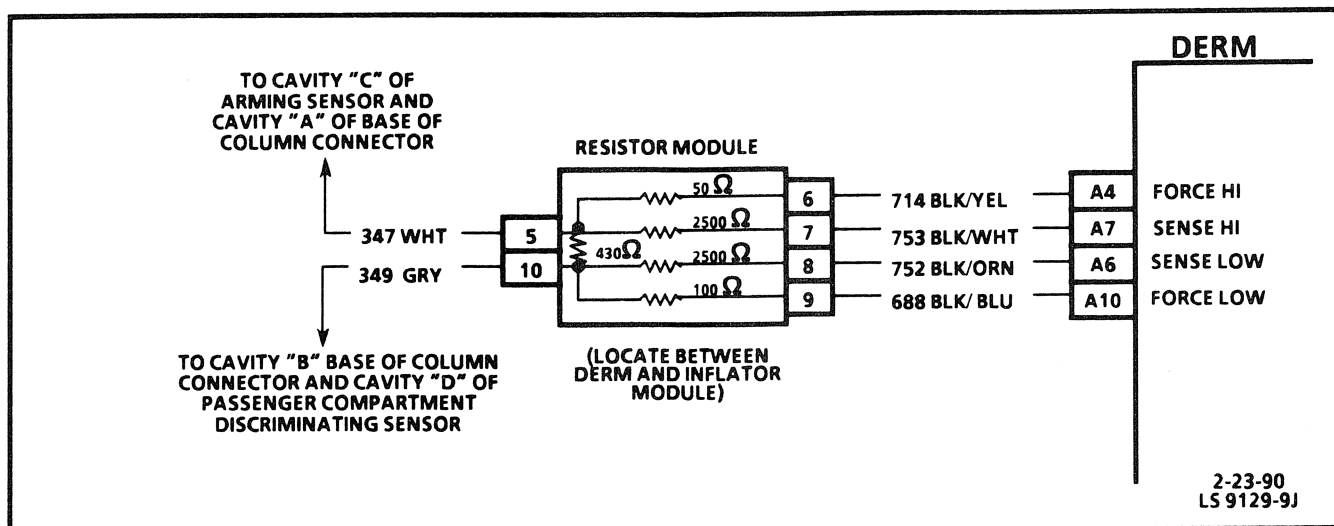
- REPAIR OPEN IN CKT 1003 BETWEEN PASSENGER COMPARTMENT DISCRIMINATING SENSOR AND GROUND.
- REFER TO WIRE REPAIR INSTRUCTIONS IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR ARMING AND PASSENGER COMPARTMENT DISCRIMINATING SENSORS AND RESISTOR MODULE.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

30 VOLTS OR MORE

LESS THAN 30 VOLTS

- REPLACE ARMING SENSOR, REFER TO SECTION "9J-B".
- RECONNECT YELLOW 2-WAY CONNECTOR PASSENGER COMPARTMENT DISCRIMINATING SENSOR AND RESISTOR MODULE.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- REPLACE DERM, REFER TO SECTION "9J-B".
- RECONNECT YELLOW 2-WAY CONNECTOR PASSENGER COMPARTMENT DISCRIMINATING SENSOR AND RESISTOR MODULE.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."



CODE 24

STEERING COLUMN VOLTAGE TOO LOW

Description:

Code 24 is set when the voltage at the Sense Low input (terminal "A6") is between 0% and 41% of 36VLR output voltage for 500 milliseconds during the "Continuous Monitoring" tests performed by the DERM. The "Continuous Monitoring" tests check the continuity of the deployment loop from the 36VLR output of the DERM through the Arming Sensor, Inflator Module and the Discriminating Sensors to ground. Code 24 will set if the Arming Sensor resistance is too high or open, the Discriminating Sensor resistance is too low or shorted, the "Force Hi," "Sense Hi," "Sense Low" or "Force Low" circuits are shorted to ground or system voltage, the high side of the deployment loop is shorted to the low side.

Test Conditions:

Tested ever 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 24 will set if the voltage at the Sense Low input (terminal A6) is between 0% and 41% of 36VLR output voltage for 500 milliseconds.

Conditions To Clear:

Code 24 will clear if the voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36VLR output voltage for 500 milliseconds.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

Notes on Fault Tree:

1. Determines if fault is short to voltage on CKT 349, CKT 347, SIR coil or Dual Sensor.
2. Determines if fault is short to voltage on CKT 347.
3. Determines if fault is short to voltage in SIR coil or Dual Sensor.
4. Determines if fault is short to voltage on CKT 348.
5. Determines if fault is short to voltage on CKT 714.
6. Determines if fault is short to voltage on CKT 752 or CKT 688.

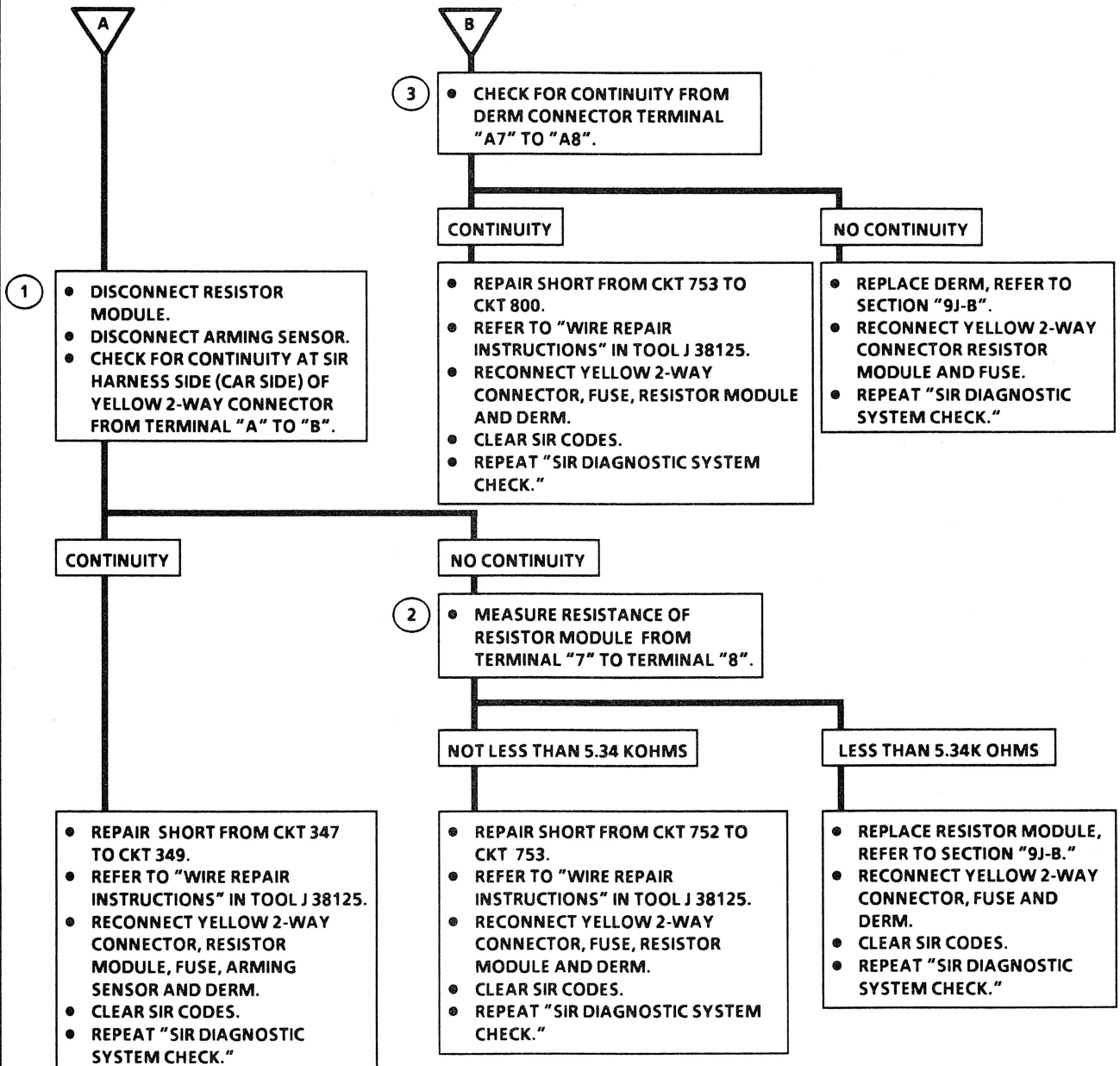
CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

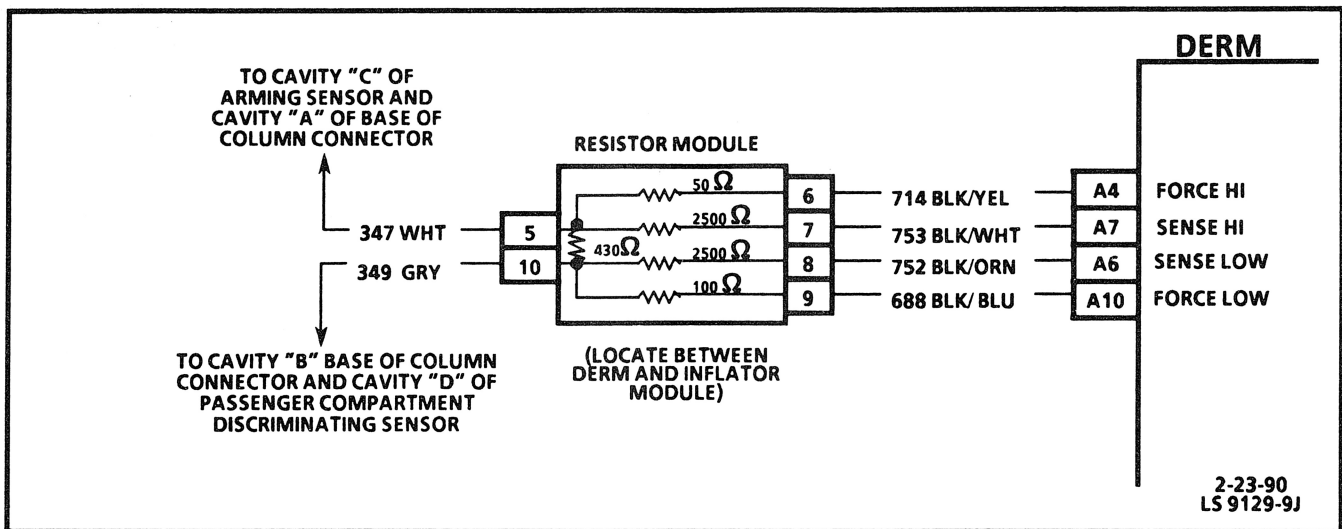
CURRENT CODE 22 CHART 2

STEERING COLUMN RESISTANCE TOO LOW

CONTINUED FROM CODE 22 CHART 1

CONTINUED FROM CODE 22 CHART 1





CODE 21 AND 22 BOTH CURRENT STEERING COLUMN RESISTANCE UNDETERMINED

Description:

The DERM injects a current of 75 milliamperes through the steering column from the Force Hi output (terminal "A4") to the Force Low input (terminal "A10"). By monitoring the voltage at the Sense Hi input (terminal "A7") and the Sense Low input (terminal "A6") the DERM calculates the combined resistance of the Inflator Module, SIR Coil, harness wiring and connector terminal contact in the steering column. Codes 22 and 21 will set if the Force Hi output (terminal "A4") is open.

Test Conditions:

Tested once each ignition cycle during the "Steering Column Resistance Test" if: 1) No faults are detected during "Turn-On;" 2) No faults are detected during "Continuous Monitoring" for 1 second; 3) No Crank signal present.

Failure Conditions:

Code 21 and 22 will set if the voltage at the Sense Low input (terminal "A6") is less than 5 volts during the first portion of the steering column resistance test. This will occur when the Force Hi output (terminal "A4") is open and results in an undetermined steering column resistance.

Conditions To Clear:

Current Code 21 and 22 will be cleared each time the Ignition Switch is turned "OFF."

Action Taken:

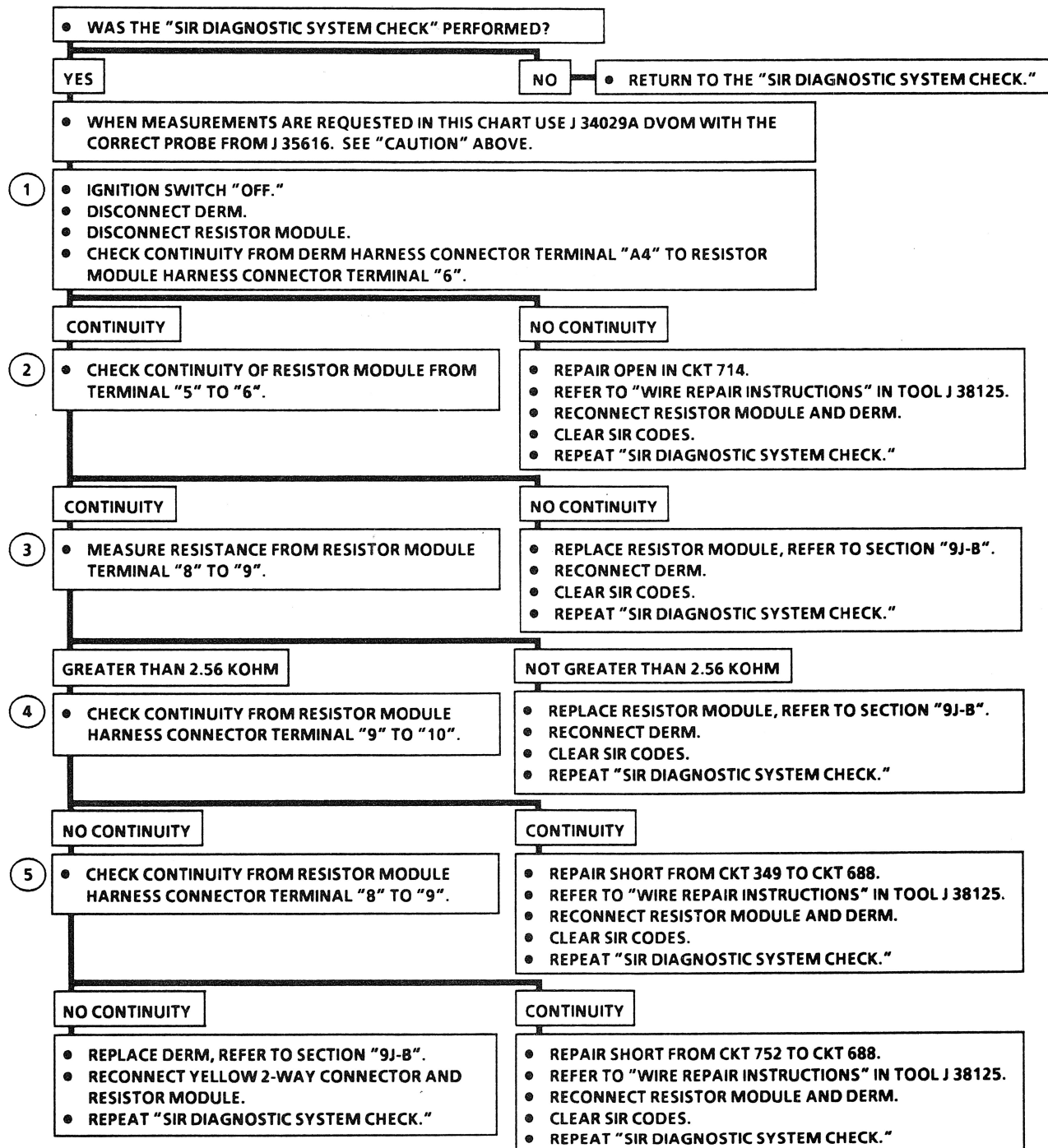
DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

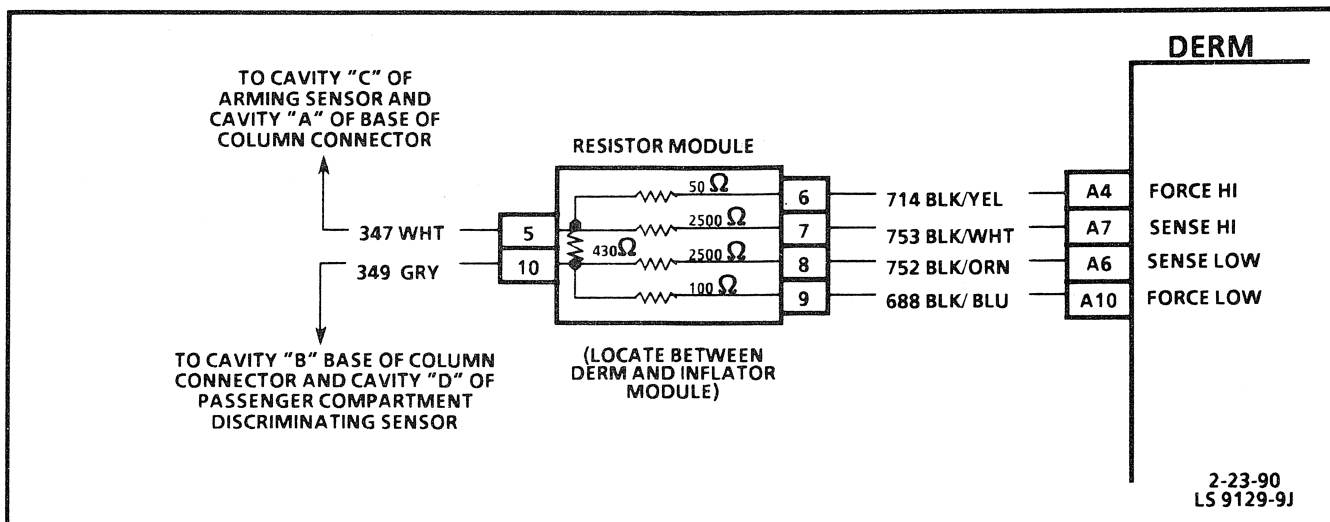
Notes on Fault Tree:

1. Checks for open in Force Hi wiring.
2. Checks for open 50 ohm resistor in resistor module.
3. Checks for proper values in resistor module.
4. Checks for short in resistor module wiring harness.
5. Checks for short in resistor module wiring harness.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 21 AND 22 BOTH CURRENT STEERING COLUMN RESISTANCE UNDETERMINED





CODE 23

STEERING COLUMN VOLTAGE TOO HIGH

Description:

Code 23 is set when the voltage at the Sense Low input (terminal "A6") is greater than 78% of 36VLR output voltage for 500 milliseconds during the "Continuous Monitoring" tests performed by the DERM. The "Continuous Monitoring" tests are performed by the DERM after the initial "Turn-On" tests are completed and are performed every 100 milliseconds while "Ignition 1" voltage is present at the DERM. The "Continuous Monitoring" tests check the continuity of the deployment loop from the 36VLR output of the DERM through the Arming Sensor, Inflator Module and the Discriminating Sensors to ground. Code 23 indicates a shorted Arming Sensor shorted harness, or open grounds on both Discriminating Sensors.

Test Condition:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 23 will set if the voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36VLR output voltage for 500 milliseconds (5 consecutive "Continuous Monitoring" cycles) after Code 23 has been set.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

Notes on Fault Tree:

1. Checks the 36VLR circuit for a short to the high side of the steering column (CKT 347).
2. Checks for open in the low side of steering column (CKT 349).
3. Checks for open in the ground circuits on both Discriminating Sensors (CKT 1003).
4. Checks for short in the Arming Sensor.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 24

STEERING COLUMN VOLTAGE TOO LOW

• WAS THE "SIR DIAGNOSTIC SYSTEM CHECK" PERFORMED?

YES

NO

• RETURN TO THE "SIR DIAGNOSTIC SYSTEM CHECK."

• WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

- IF CODE 31 IS CURRENT THEN GO TO CODE 31 CHART.
- IF CODE 32 IS CURRENT THEN GO TO CODE 32 CHART.
- IF CODE 34 IS CURRENT THEN GO TO CODE 34 CHART.
- IF CODE 42 IS CURRENT THEN GO TO CODE 42 CHART.

1

- IGNITION SWITCH "OFF."
- DISCONNECT DERM, YELLOW 2-WAY CONNECTOR AT THE BASE OF STEERING COLUMN, ARMING SENSOR AND PASSENGER SENSOR COMPARTMENT DISCRIMINATING SENSOR.
- IGNITION SWITCH "ON."
- MEASURE VOLTAGE TO GROUND FROM ARMING SENSOR HARNESS CONNECTOR TERMINAL "C".

VOLTAGE

NO VOLTAGE

2

- DISCONNECT RESISTOR MODULE.
- MEASURE VOLTAGE TO GROUND FROM ARMING SENSOR HARNESS CONNECTOR TERMINAL "C".

3

- RECONNECT ARMING SENSOR.
- MEASURE VOLTAGE TO GROUND FROM SIR HARNESS SIDE (CAR SIDE) OF YELLOW 2-WAY CONNECTOR TERMINAL "B".

NO VOLTAGE

VOLTAGE

VOLTAGE

NO VOLTAGE

4

- MEASURE VOLTAGE TO GROUND FROM PASSENGER COMPARTMENT DISCRIMINATING SENSOR HARNESS CONNECTOR TERMINAL "E".

- REPAIR SHORT TO VOLTAGE ON CKT 347.
- REFER TO INSTRUCTIONS IN TOOL J 38125.
- RECONNECT ALL SIR SYSTEM COMPONENTS.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

- REPLACE ARMING SENSOR, REFER TO SECTION "9J-B."
- RECONNECT ALL SIR SYSTEM COMPONENTS.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECKS."

- REPLACE SIR COIL, REFER TO SECTION "3C".
- RECONNECT ALL SIR SYSTEM CONNECTORS.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECKS."

NO VOLTAGE

VOLTAGE

- REPAIR SHORT TO VOLTAGE ON CKT 349.
- REFER TO INSTRUCTIONS IN TOOL J 38125.

5

- MEASURE VOLTAGE TO GROUND FROM DERM CONNECTOR TERMINAL "A4".

NO VOLTAGE

VOLTAGE

- REPAIR SHORT TO VOLTAGE ON CKT 714.
- REFER TO INSTRUCTIONS IN TOOL J 38125.

6

- MEASURE VOLTAGE TO GROUND FROM DERM CONNECTOR TERMINAL "A6".

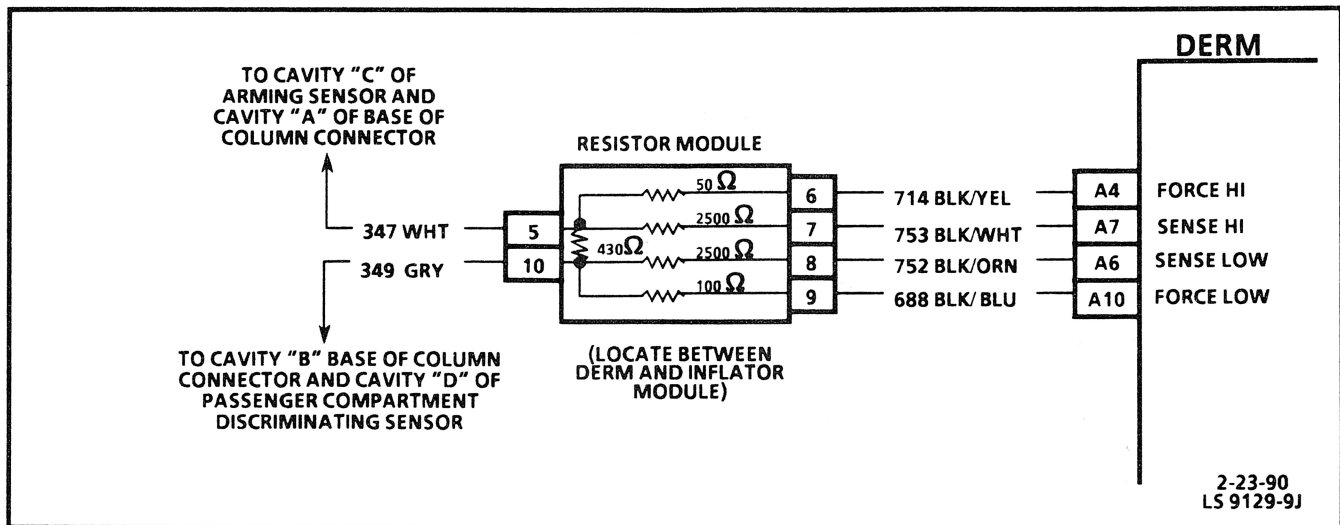
NO VOLTAGE

VOLTAGE

- REPAIR SHORT TO VOLTAGE ON CKT 752.
- REFER TO INSTRUCTIONS IN TOOL J 38125.

- REPAIR SHORT TO VOLTAGE ON CKT 688.
- REFER TO INSTRUCTIONS IN TOOL J 38125.

- RECONNECT ALL SIR SYSTEM COMPONENTS.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."



CODE 25

SHORT TO BATTERY IN STEERING COLUMN

Description:

The DERM grounds the Force Low input (terminal "A10") and then monitors the voltage at the Sense Low input (terminal "A6"). If the voltage is greater than 3 volts Code 25 will set. Code 25 is an indication of a short to system voltage in the steering column Arming Sensor, or associated wiring. Additionally, this code can be set if the actual resistance of the 100 ohm resistor within the resistor module is too high or is open.

Test Conditions:

Tested once each ignition cycle during the "Steering Column Resistance Test" if: 1) No faults are detected during "Turn-On;" 2) No faults are detected during "Continuous Monitoring" for 1 second; 3) No Crank signal present.

Failure Conditions:

Code 25 will set if the voltage at the Sense Low Input (terminal "A6") is equal to "Ignition 1" voltage (± 2 volts) during the first portion of the "Steering Column Resistance Test."

Conditions to Clear:

Current Code 25 will be cleared each time the Ignition Switch is turned "OFF."

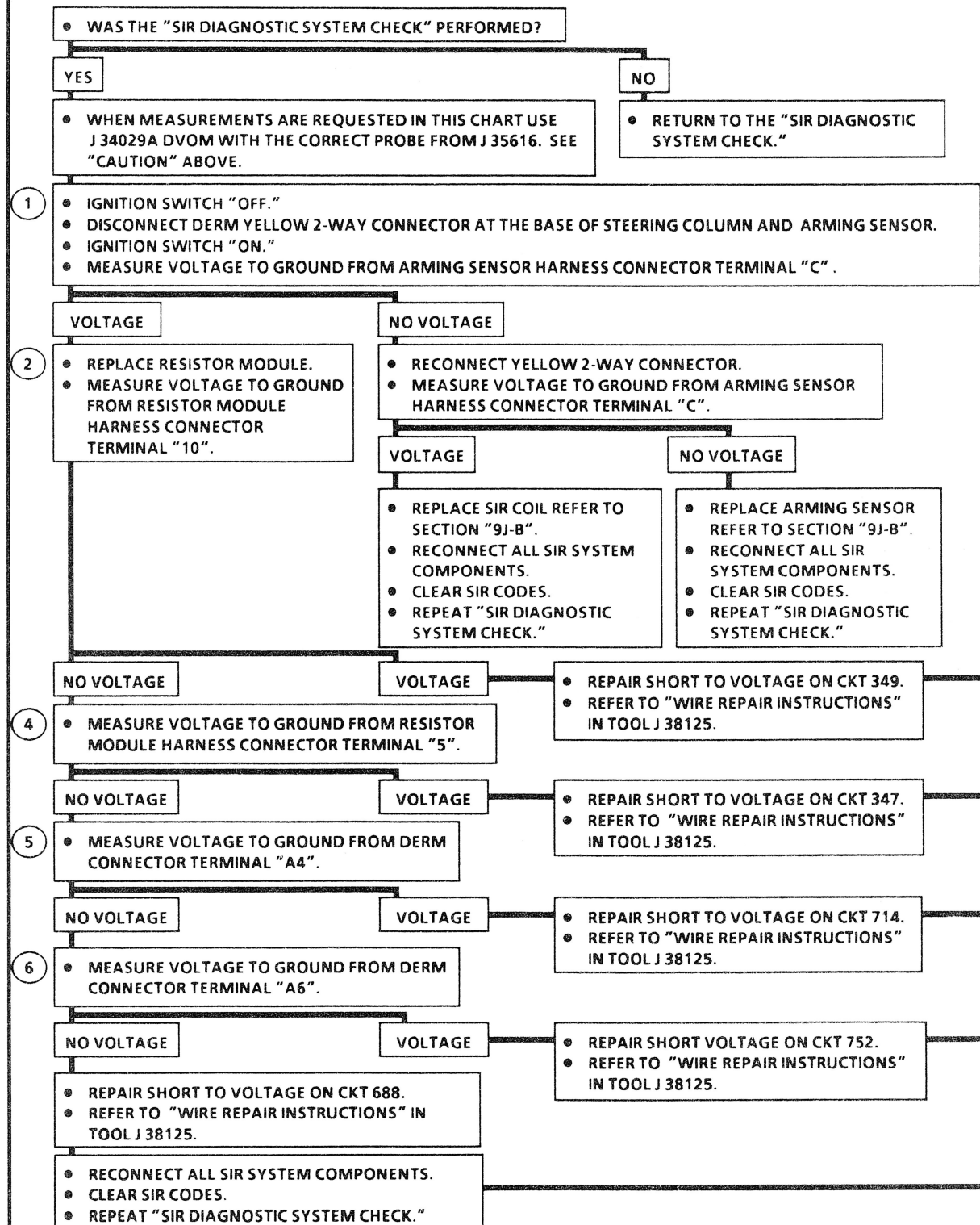
Notes on Fault Tree:

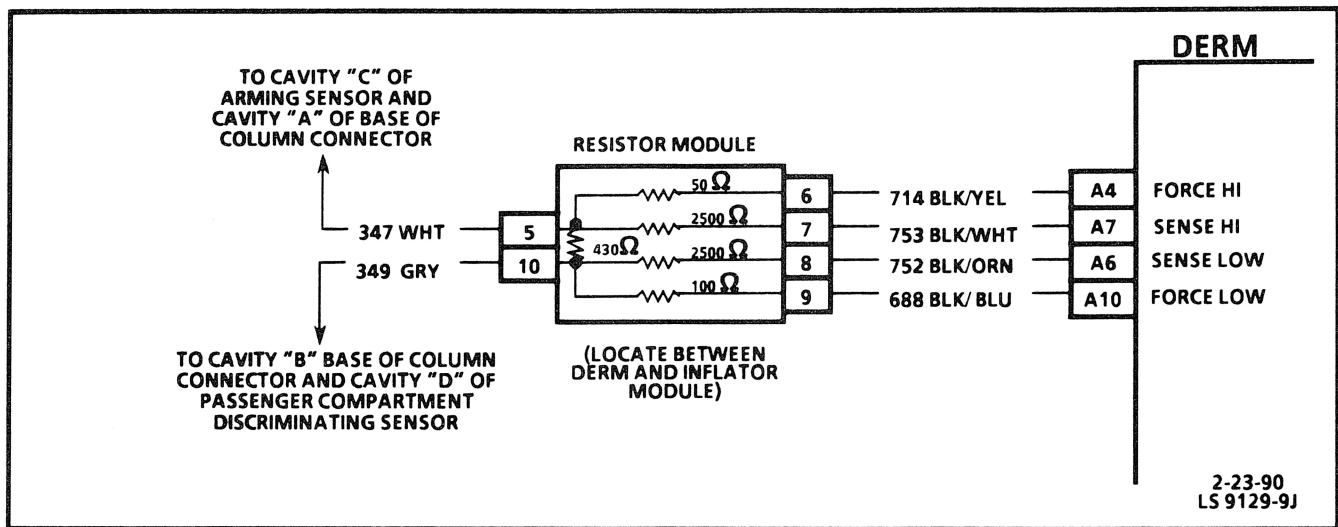
1. Determines if fault is short to voltage in SIR coil.
2. Determines if fault is short to voltage on CKT 349.
3. Determines if fault is defective SIR coil or Arming Sensor.
4. Determines if fault is short to voltage on CKT 347.
5. Determines if fault is short to voltage on CKT 714.
6. Determines if fault is short to voltage on CKT 752 or CKT 688.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 25

SHORT TO BATTERY IN STEERING COLUMN





CODE 26

OPEN IN STEERING COLUMN

Description:

If there is an open in the SIR Coil, Inflator Module or wiring in the steering column the resistance between the Sense Hi input (terminal "A7") and the Sense Low input (terminal "A6") increases. This increased resistance causes a larger voltage drop from the Sense Hi input to the Sense Low input, across the 430 ohm resistor in the Resistor Module. The increase in voltage between the Sense Hi input and the Sense Low input is sensed by the DERM during the "Continuous Monitoring" tests and Code 26 is set.

Test Conditions:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 26 will set if the voltage at the Sense Hi input (terminal "A7") minus the voltage at the Sense Low input (terminal "A6") is greater than 0.45 volts for 500 milliseconds.

Conditions to Clear:

Current Code 26 will clear if the voltage at the Sense Hi input (terminal "A7") minus the voltage at the Sense Low input (terminal "A6") is greater than 0 volts but less than 0.40 volts for 500 milliseconds after Code 26 has been set.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

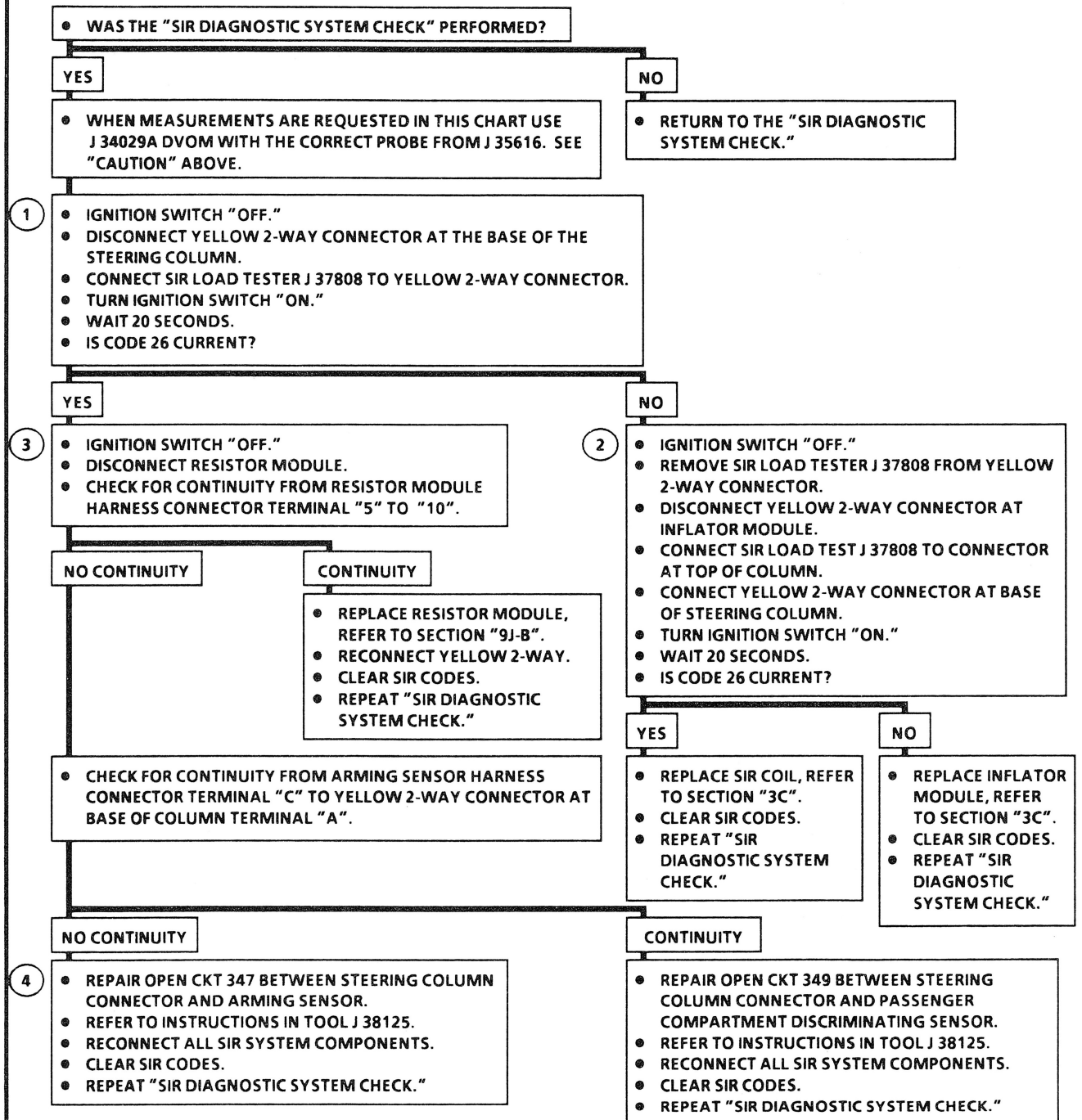
Notes on Fault Tree:

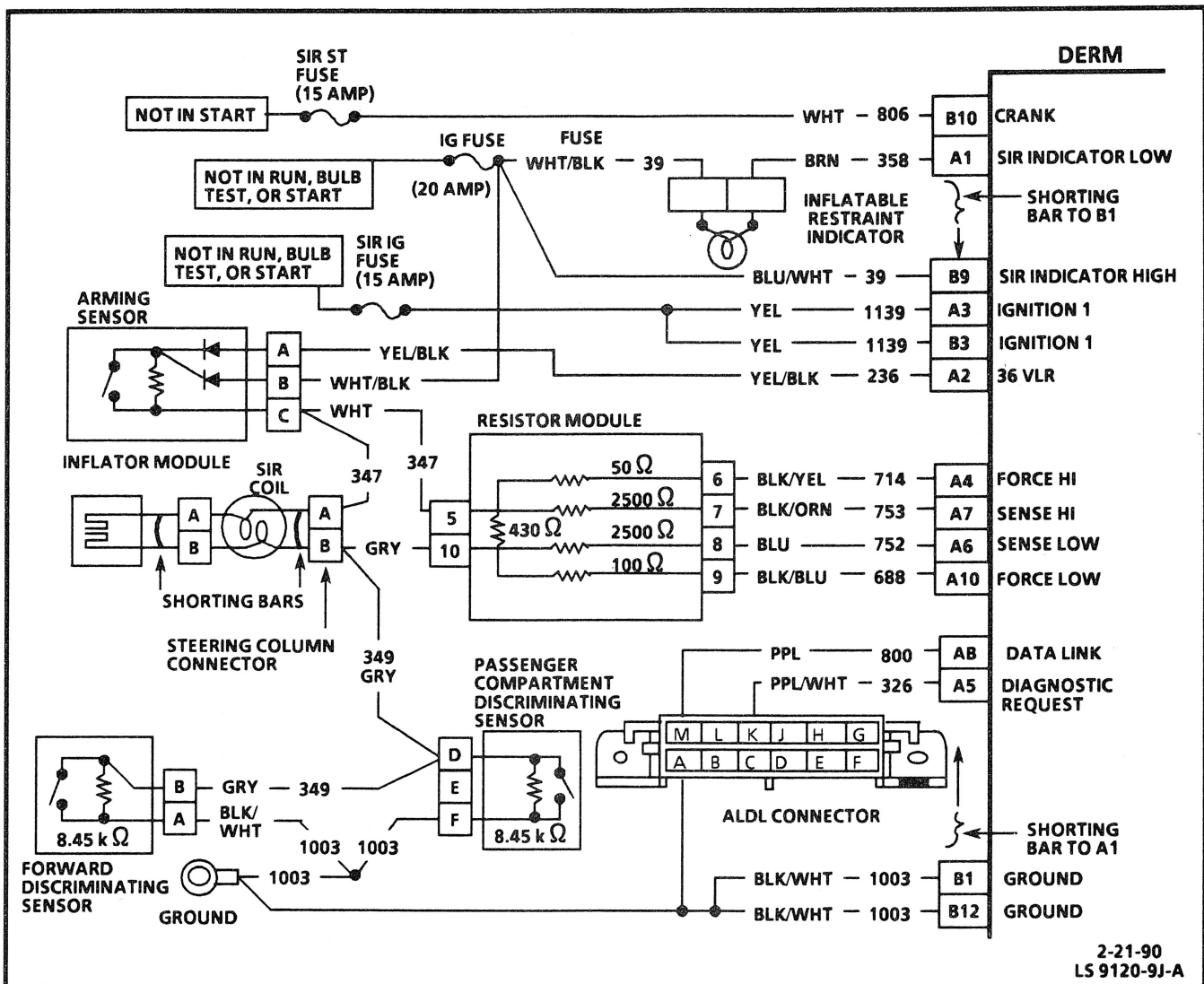
1. Checks if fault is in the steering column. The SIR load tester J 37808 simulates the resistance of good steering column wiring and components.
2. Checks if fault is in the Inflator Module or the SIR Coil.
3. Checks if fault is in resistor module.
4. Checks if fault is in CKT 347 or CKT 349.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 26

OPEN IN STEERING COLUMN





CODE 31

OPEN 36VLR TO DEPLOYMENT LOOP

Description:

The voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36 VLR output voltage when 36VLR output of the DERM is functional. Should the circuit open between the 36 VLR output and the Arming Sensor, "Ignition 1" voltage will be supplying the deployment loop. The voltage at the Sense Low input (terminal "A6") will decrease due to the decrease in the supply voltage and Code 31 will set after 700 milliseconds (if Code 42 is not set). Code 31 indicates an open in the wiring between the 36VLR output of the DERM and the Arming Sensor, an open diode in the Arming Sensor or problem with Sense High or Sense Low circuits.

Test Conditions:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 31 will set if: 1) The voltage at the Sense Low input (terminal "A6") is between 28% and 59% of "Ignition 1" output voltage for 700 milliseconds; 2) Code 42 is not set.

Conditions To Clear:

Current Code 31 will clear if the voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36 VLR output voltage for 500 milliseconds.

Action Taken:

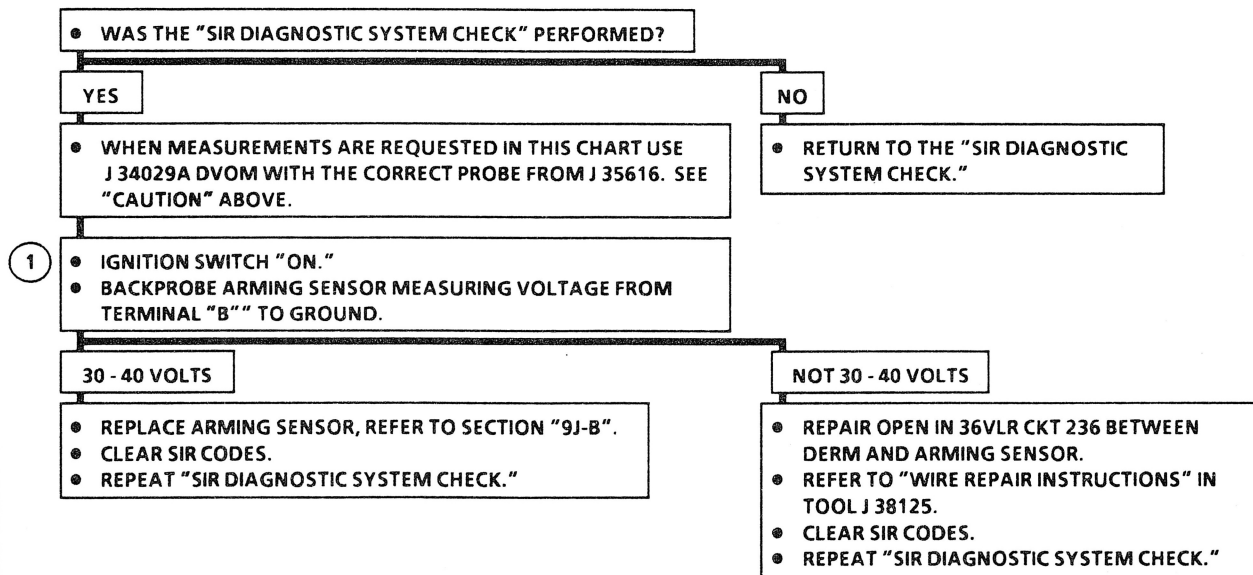
DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

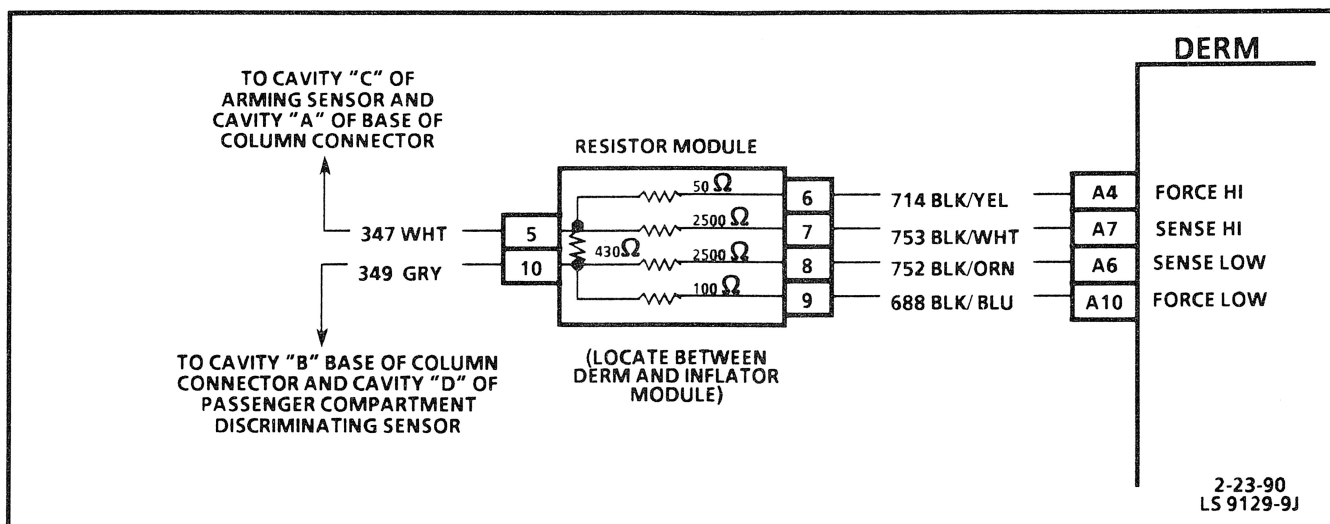
Note on Fault Tree:

- Checks if the fault is in the 36VLR circuit between the DERM and the Arming Sensor or if the fault is in the Arming Sensor.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 31
OPEN 36VLR TO
DEPLOYMENT LOOP





CODE 32

GROUNDING 36VLR TO DEPLOYMENT LOOP

Description:

The voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36VLR output voltage when 36VLR output of the DERM is charged. Should the circuit short to ground between the 36VLR output and the Arming Sensor, "Ignition 1" voltage will be supplying the deployment loop. The voltage at the Sense Low input (terminal "A6") will decrease due to the decrease in the supply voltage and Code 32 will set after 700 milliseconds. Code 32 indicates a short to ground in the wiring between the 36VLR output of the DERM and the Arming Sensor.

Test Condition:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 32 will set if: 1) The voltage at the Sense Low input (terminal "A6") is between 28% and 59% of "Ignition 1" output voltage for 700 milliseconds; 2) Code 42 is set.

Conditions To Clear:

Current 32 will clear if the voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36VLR output voltage for 500 milliseconds.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

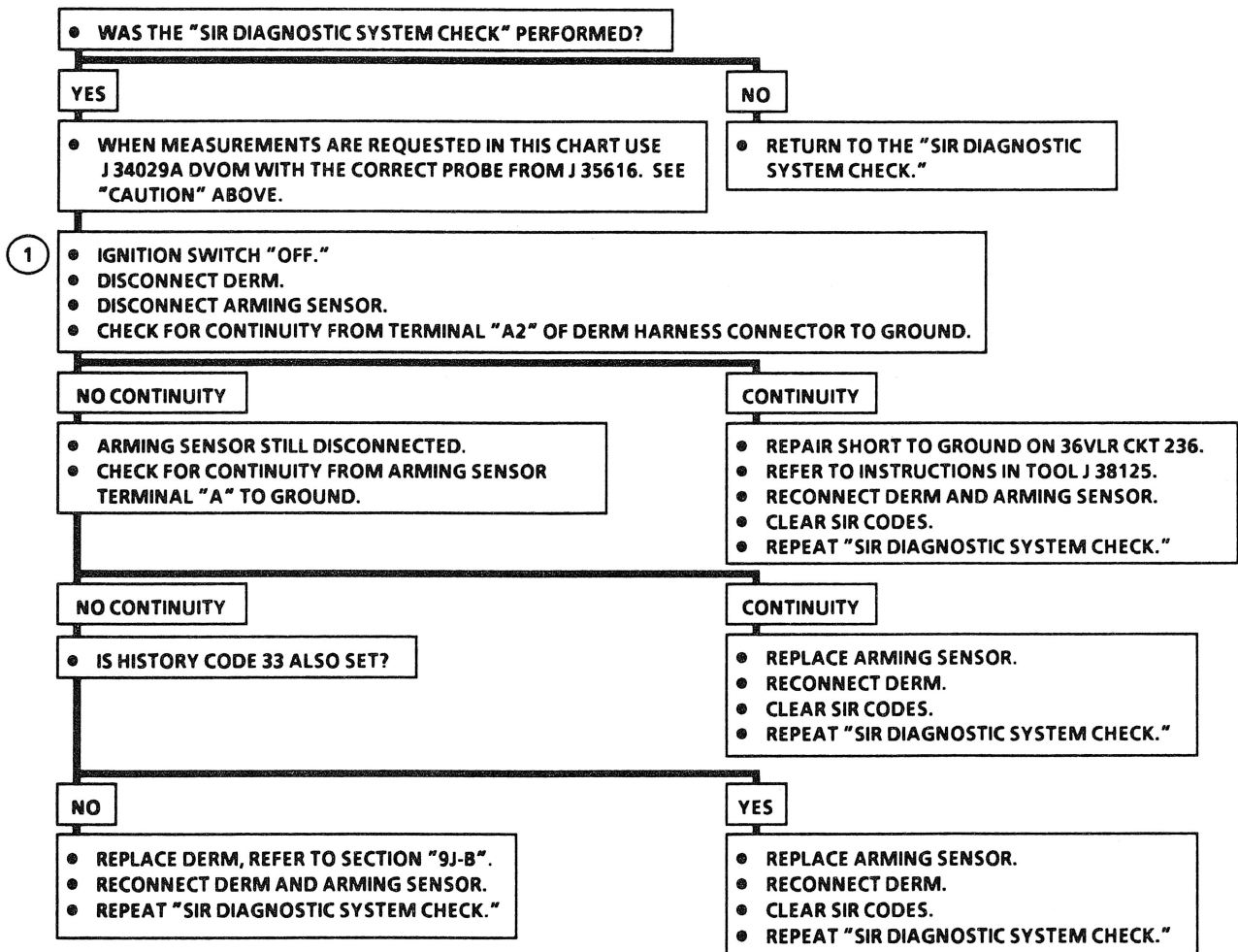
Note on Fault Tree:

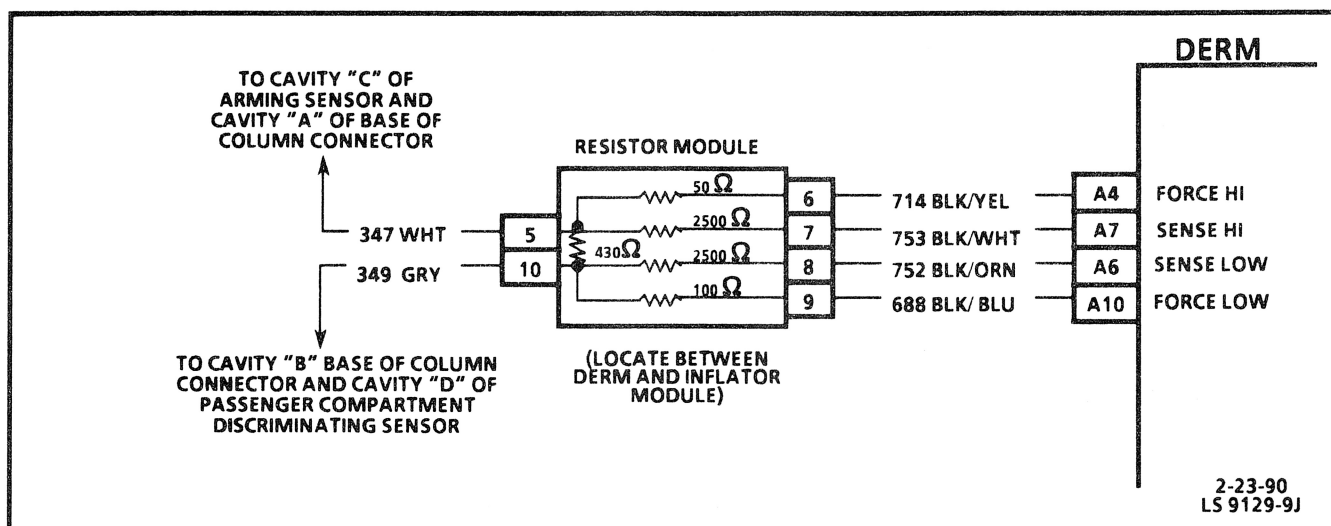
1. Checks for a short to ground in the 36VLR circuit between the DERM and the Arming Sensor.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 32

GROUNDING 36VLR TO DEPLOYMENT LOOP





HISTORY CODE 33

STEERING DIODE SHORTED IN ARMING SENSOR

Description:

At "Turn-On" the DERM monitors the voltage at the 36VLR output (terminal "A2") before this output begins to charge. If the diode in the Arming Sensor connected to "Ignition 1" is shorted, "Ignition 1" voltage will be present at the 36VLR output (terminal "A2") as soon as the ignition is turned "ON." If the DERM detects this ignition voltage (± 2 volts) three ignition cycles in a row History Code 33 will be set.

Test Condition:

Tested once during each ignition cycle at "Turn-On."

Failure Conditions:

History Code 33 will set if the voltage at the 36VLR output of the DERM (terminal "A2") is equal to the "Ignition 1" voltage (± 2 volts) within the first 500 milliseconds after the ignition is turned "ON," three ignition cycles in a row.

Conditions To Clear:

History Code 33 will remain as a History Code until codes are cleared with a "Scan" tool.

Action Taken:

DERM will not turn "ON" "INFLATABLE RESTRAINT" indicator lamp.

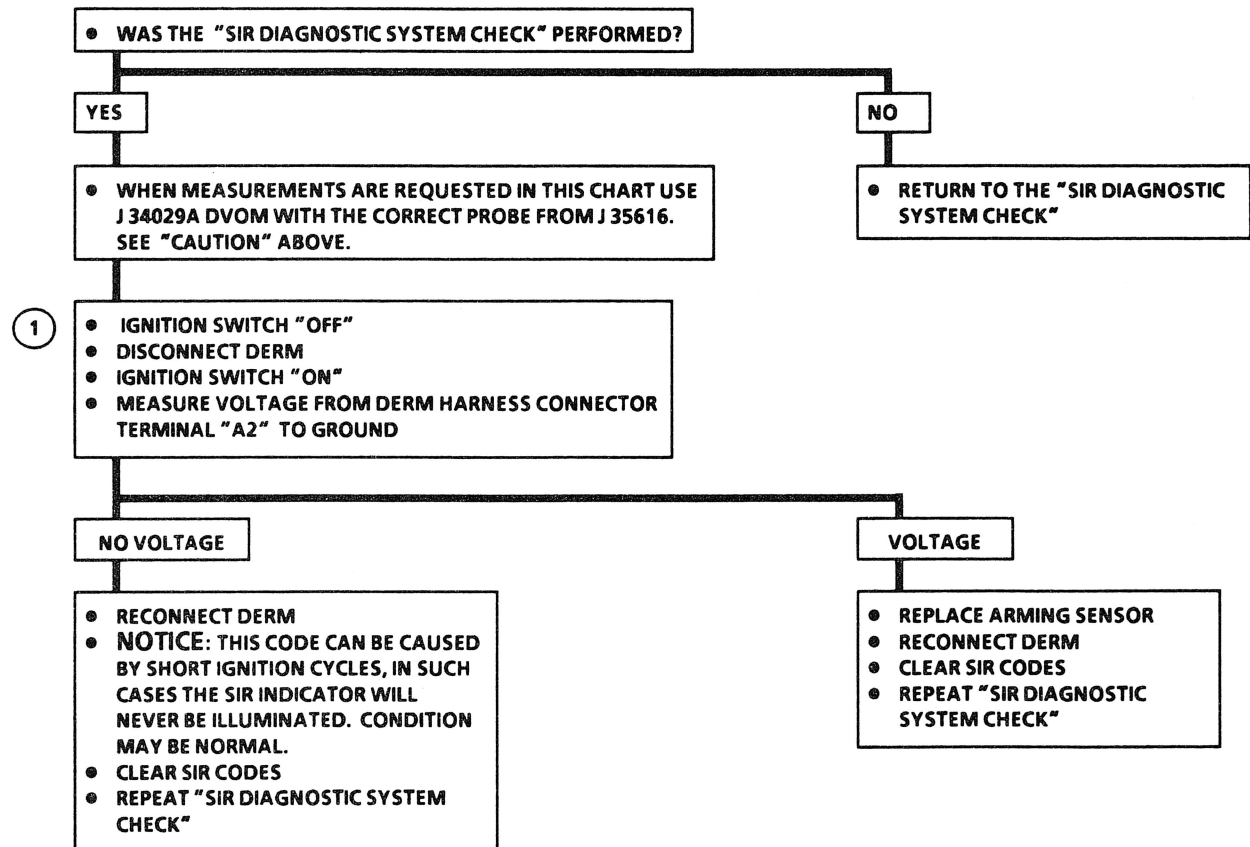
Note on Fault Tree:

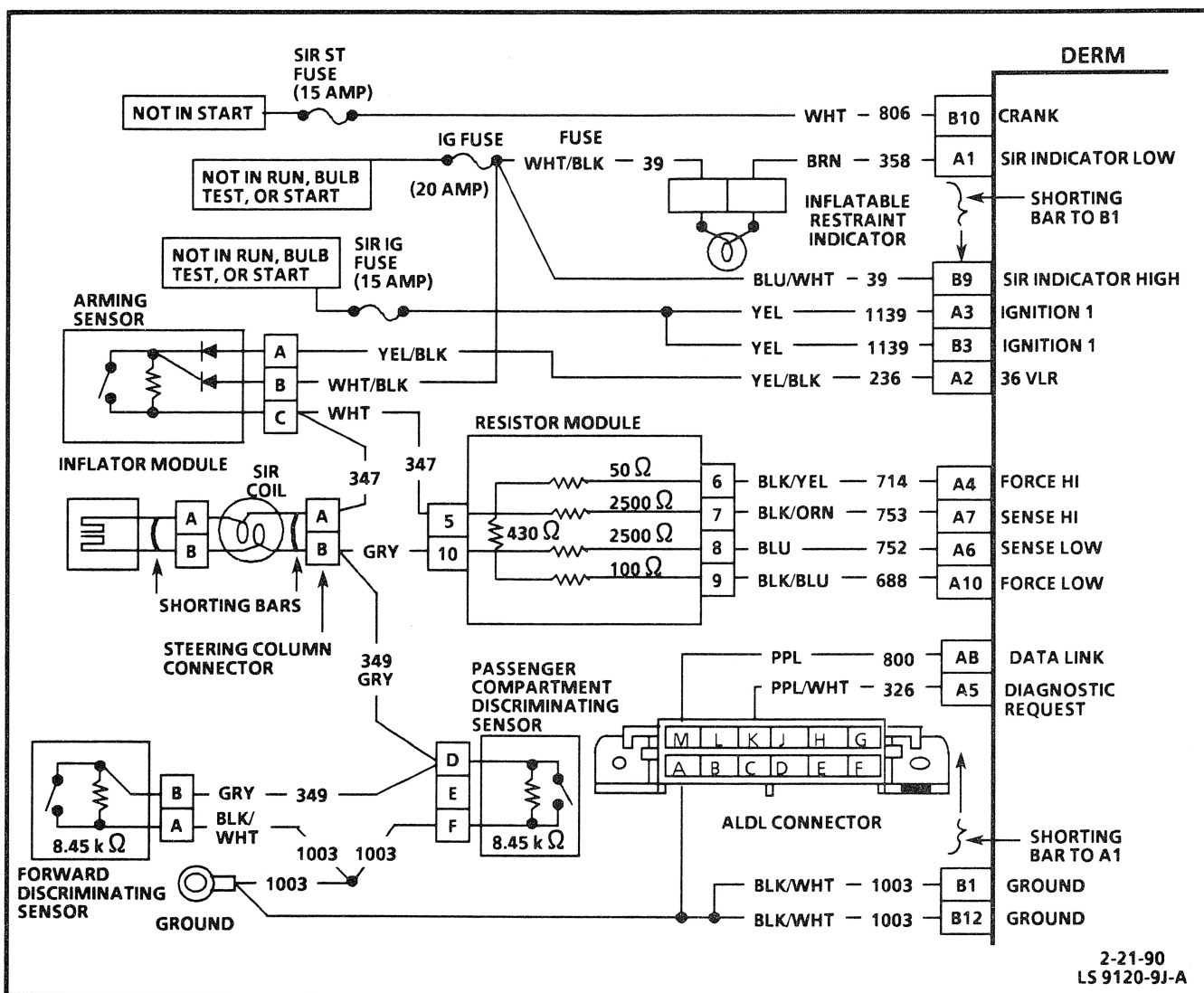
1. Checks if diode on 36VLR circuit in the Arming Sensor is shorted.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

HISTORY CODE 33

STEERING DIODE SHORTED IN ARMING SENSOR





CODE 34 CHART 1

OPEN IN "IGNITION 1" FEED TO DEPLOYMENT LOOP

Description:

At "Turn-On" the DERM monitors the voltage at the Sense Low input (terminal "A6") for 500 milliseconds. The DERM expects the voltage to be between 28% and 59% of "Ignition 1" voltage before the 36VLR output is charged. If "Ignition 1" circuit from the SIR fuse to the Arming Sensor is open or the "Ignition 1" diode in the Arming Sensor is open the voltage at the Sense Low input (terminal "A6") will be less than 4.6 volts and Code 34 will set.

Test Condition:

Tested once during ignition cycle at "Turn-On."

Failure Conditions:

Code 34 will set if the voltage at the Sense Low input (terminal "A6") is less than 28% of "Ignition 1" output voltage for 500 milliseconds

and 36VLR is less than "Ignition 1" output voltage at "Turn-On."

Conditions To Clear:

To clear Code 34, the ignition must be "OFF" long enough to assure the 36VLR supply voltage has full discharged. Once 36VLR is discharged, the DERM will again check the failure conditions upon key "ON." If the failure conditions are not present (no failure indicated) then, and only then, will current Code 34 be cleared.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 34 CHART 1

OPEN IN "IGNITION 1" FEED TO DEPLOYMENT LOOP

• WAS THE "SIR DIAGNOSTIC SYSTEM CHECK" PERFORMED?

YES

NO

• RETURN TO THE "SIR DIAGNOSTIC SYSTEM CHECK."

• WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

• IS CODE 24 ALSO SET?

YES

NO

• DISCONNECT ARMING SENSOR.
• TURN IGNITION SWITCH "ON."
• CHECK VOLTAGE FROM ARMING SENSOR HARNESS CONNECTOR TERMINAL "B" TO GROUND.

• IGNITION SWITCH "OFF."
• DISCONNECT YELLOW 2-WAY CONNECTOR AT THE BASE OF THE STEERING COLUMN.
• CONNECT SIR LOAD TEST J 37808 TO YELLOW 2-WAY CONNECTOR.
• TURN IGNITION SWITCH "ON."
• WAIT 20 SECONDS.
• ARE BOTH CODES 24 AND 34 CURRENT?

YES

NO

SYSTEM VOLTAGE

NOT SYSTEM VOLTAGE

• REPLACE ARMING SENSOR, REFER TO SECTION "9J-B".

• REPAIR OPEN IN CKT 39.
• RECONNECT ARMING SENSOR.

• CLEAR SIR CODES.
• REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

• TURN IGNITION "OFF" AND DISCONNECT DERM, ARMING SENSOR RESISTOR MODULE AND SIR LOAD TESTER J 37808.
• CHECK FOR CONTINUITY FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "5" TO GROUND.

• IGNITION SWITCH "OFF."
• REMOVE SIR LOAD TESTER.
• DISCONNECT YELLOW 2-WAY CONNECTOR AT INFLATOR MODULE.
• CONNECT SIR LOAD TESTER J 37808 TO CONNECTOR AT INFLATOR MODULE.
• CONNECT YELLOW 2-WAY CONNECTOR AT BASE OF STEERING COLUMN.
• TURN IGNITION SWITCH "ON."
• WAIT 20 SECONDS.
• ARE BOTH CODES 24 AND 34 CURRENT?

YES

NO

• REPLACE SIR COIL, REFER TO SECTION "3C".
• RECONNECT ALL SIR SYSTEM COMPONENTS.
• CLEAR SIR CODES.
• KEY "OFF" FOR 10 MINUTES.
• REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

• REPLACE INFLATOR MODULE, REFER TO SECTION "3C".
• RECONNECT ALL SIR SYSTEM COMPONENTS.
• CLEAR SIR CODES.
• KEY "OFF" FOR 10 MINUTES.
• REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

NO CONTINUITY

CONTINUITY

• REPAIR SHORT TO GROUND ON CKT 347.

• CHECK FOR CONTINUITY FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "6" TO GROUND.

NO CONTINUITY

CONTINUITY

• REPAIR SHORT TO GROUND ON CKT 714.

• CHECK FOR CONTINUITY FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "7" TO GROUND.

NO CONTINUITY

CONTINUITY

• REPAIR SHORT TO GROUND ON CKT 753.

• CHECK FOR CONTINUITY FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "8" TO GROUND.

NO CONTINUITY

CONTINUITY

• REPAIR SHORT TO GROUND ON CKT 752.

• CHECK FOR CONTINUITY FROM RESISTOR MODULE HARNESS CONNECTOR TERMINAL "9" TO GROUND.

NO CONTINUITY

CONTINUITY

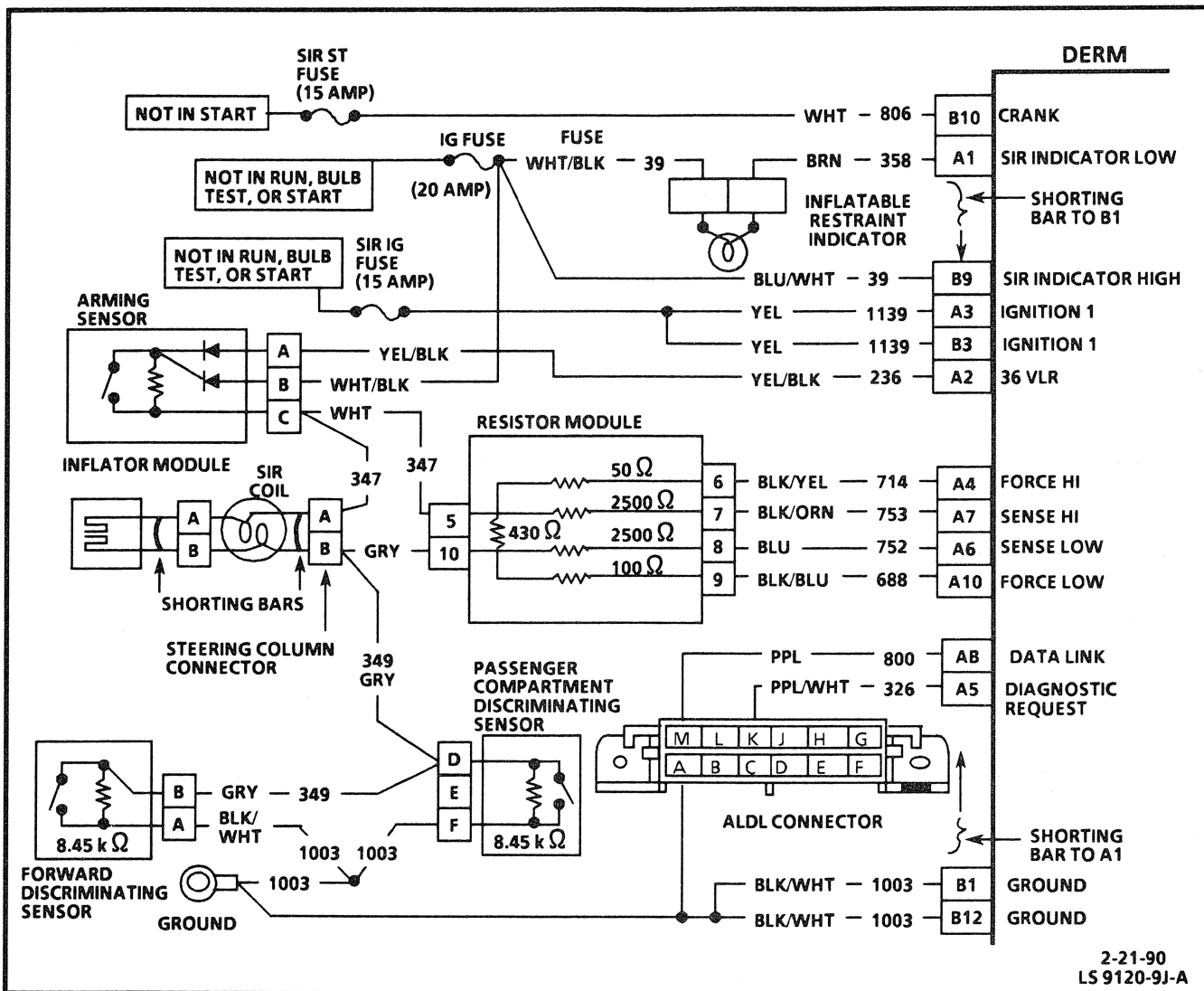
• REPAIR SHORT TO GROUND ON CKT 688.



CONTINUED ON
CODE 34 CHART 2
(NEXT PAGE)

• RECONNECT DERM, ARMING SENSOR, RESISTOR MODULE AND YELLOW 2-WAY CONNECTOR AT BASE OF STEERING COLUMN.
• CLEAR SIR CODES.
• KEY "OFF" FOR 10 MINUTES.
• REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

2-22-90
LS 9143-9J



CODE 34 CHART 2

OPEN IN "IGNITION 1" FEED TO DEPLOYMENT LOOP

Description:

At "Turn-On" the DERM monitors the voltage at the Sense Low input (terminal "A6") for 500 milliseconds. The DERM expects the voltage to be between 28% and 59% of "Ignition 1" voltage before the 36VLR output is charged. If "Ignition 1" circuit from the SIR fuse to the Arming Sensor is open or the "Ignition 1" diode in the Arming Sensor is open the voltage at the Sense Low input (terminal "A6") will be less than 4.6 volts and Code 34 will set.

Test Conditions:

Tested once during each ignition cycle at "Turn-On."

Failure Conditions:

Code 34 will set if the voltage at the Sense Low input (terminal "A6") is less than 28% of "Ignition 1" output voltage for 500 milliseconds

and 36VLR is less than "Ignition 1" output voltage at "Turn-On."

Conditions To Clear:

To clear Code 34, the ignition must be "OFF" long enough to assure the 36VLR supply voltage has fully discharged. Once 36VLR is discharged, the DERM will again check the failure conditions upon key "ON." If the failure conditions are not present (no failure indicated) then, and only then, will current Code 34 be cleared.

Action Taken:

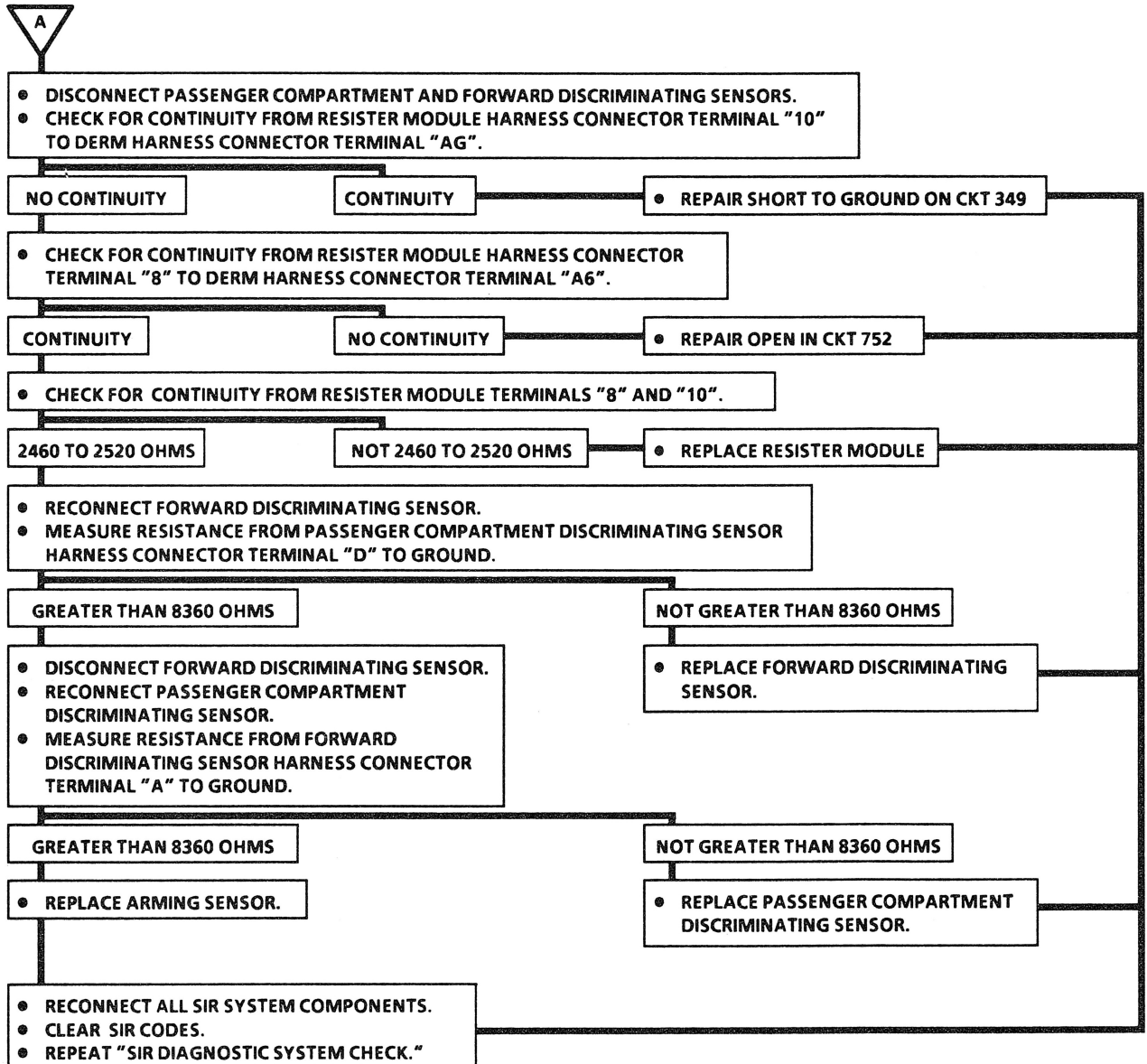
DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

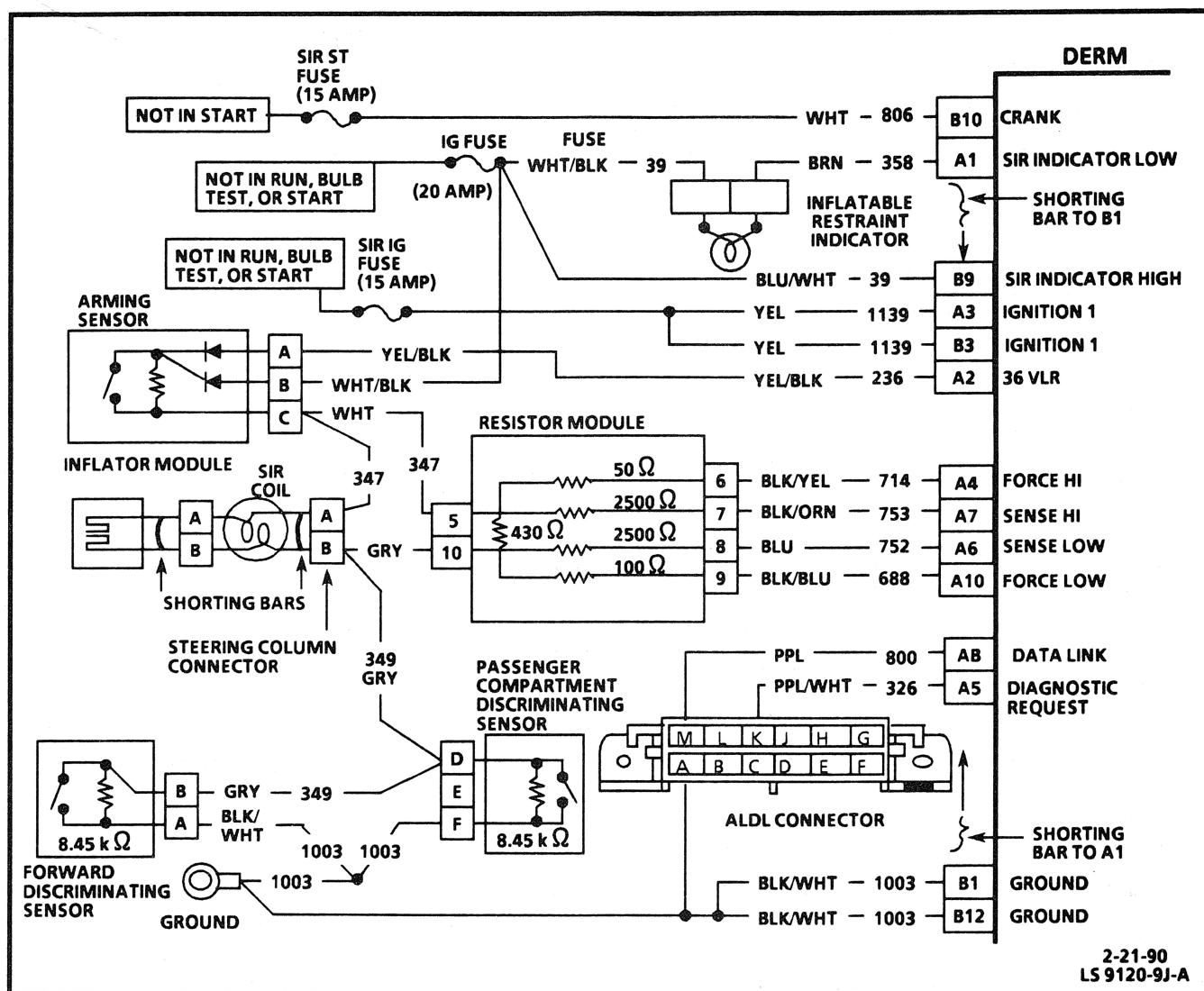
CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 34 CHART 2

OPEN IN "IGNITION 1" FEED TO DEPLOYMENT LOOP

CONTINUED FROM CODE 34 CHART 1





2-21-90
LS 9120-9J-A

CODE 35 CHART 1

DISCRIMINATING SENSOR OPEN

Description:

Code 35 is set when the voltage the Sense Low input (terminal "A6") is between 61% and 78% of 36VLR output voltage for 500 milliseconds during the "Continuous Monitoring" tests performed by the DERM. The "Continuous Monitoring" tests are performed by the DERM after the initial "Turn-On" tests are completed and are performed every 100 milliseconds while "Ignition 1" voltage is present at the DERM. If one of the Discriminating Sensors is open the Voltage at the Sense Low input will increase due to the increase in the resistance of the Discriminating Sensor section of the deployment loop and Code 35 will set.

Test Condition:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 35 will set if the voltage at the Sense Low input (terminal "A6") is between 61% and 78% of 36VLR output voltage for 500 milliseconds.

Conditions To Clear:

Current Code 35 will clear if the voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36VLR output voltage for 500 milliseconds.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

Note on Fault Tree:

1. Checks the resistance of the Forward Discriminating Sensor.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 35 CHART 1 DISCRIMINATING SENSOR OPEN

- WHEN MEASUREMENTS ARE REQUESTED IN THIS CHART USE J 34029A DVOM WITH THE CORRECT PROBE FROM J 35616. SEE "CAUTION" ABOVE.

1

- IGNITION SWITCH "OFF."
- DISCONNECT YELLOW 2-WAY CONNECTOR AT THE BASE OF THE STEERING COLUMN.
- DISCONNECT PASSENGER COMPARTMENT DISCRIMINATING SENSOR.
- MEASURE RESISTANCE ON SIR HARNESS SIDE (CAR SIDE) OF YELLOW 2-WAY CONNECTOR FROM TERMINAL "B" TO GROUND.

8.54 KOHMS OR MORE

- DISCONNECT THE FORWARD DISCRIMINATING SENSOR.
- MEASURE RESISTANCE FROM TERMINAL "A" TO "B" OF THE FORWARD DISCRIMINATING SENSOR.

LESS THAN 8.54 KOHMS

- CHECK CONTINUITY TO GROUND FROM FORWARD DISCRIMINATING SENSOR HARNESS CONNECTOR TERMINAL "B".

8.54 KOHMS OR MORE

- REPLACE FORWARD DISCRIMINATING SENSOR, REFER TO SECTION "9J-B".
- RECONNECT YELLOW 2-WAY CONNECTOR, FORWARD DISCRIMINATING SENSOR AND PASSENGER COMPARTMENT DISCRIMINATING SENSOR.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

LESS THAN 8.54 KOHMS

- CHECK CONTINUITY FROM PASSENGER COMPARTMENT DISCRIMINATING SENSOR HARNESS CONNECTOR TERMINAL "F" TO GROUND.

NO CONTINUITY

- REPAIR OPEN IN CKT 1003 BETWEEN PASSENGER COMPARTMENT DISCRIMINATING SENSOR AND GROUND.
- REFER TO "WIRE REPAIR INSTRUCTIONS" IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR AND PASSENGER COMPARTMENT DISCRIMINATING SENSOR.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

CONTINUITY



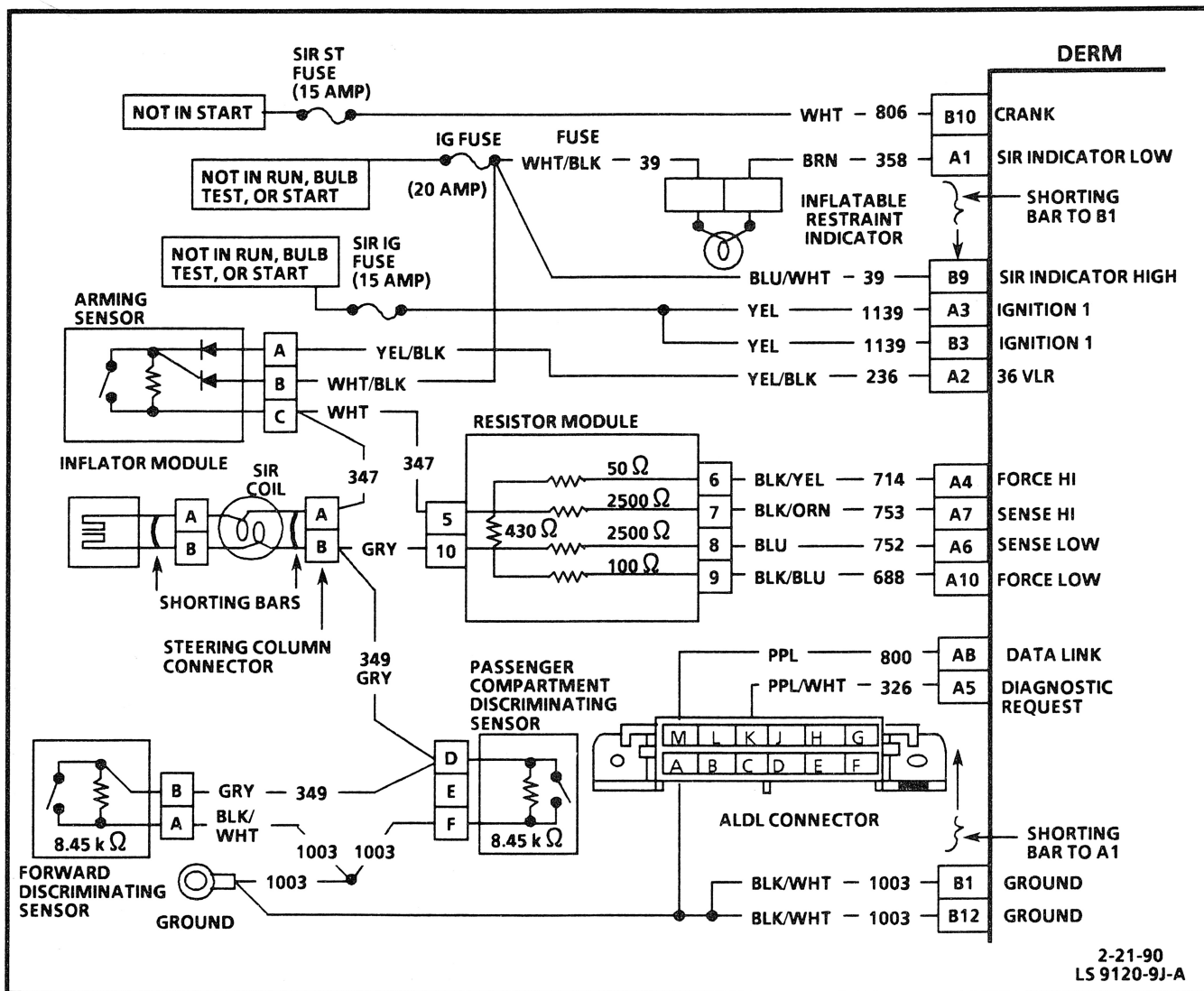
CONTINUED
ON CODE 35
CHART 2
(NEXT PAGE)

NO CONTINUITY

- REPAIR OPEN IN CKT 1003 BETWEEN FORWARD DISCRIMINATING SENSOR AND GROUND.
- REFER TO "WIRE REPAIR INSTRUCTIONS" IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR, FORWARD DISCRIMINATING SENSOR AND PASSENGER COMPARTMENT DISCRIMINATING SENSOR.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

CONTINUITY

- REPAIR OPEN IN CKT 349 BETWEEN FORWARD DISCRIMINATING SENSOR AND THE STEERING COLUMN.
- REFER TO "WIRE REPAIR INSTRUCTIONS" IN TOOL J 38125.
- RECONNECT YELLOW 2-WAY CONNECTOR, FORWARD DISCRIMINATING SENSOR AND PASSENGER COMPARTMENT DISCRIMINATING SENSOR.
- CLEAR SIR CODES.
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."



CODE 35 CHART 2

DISCRIMINATING SENSOR OPEN

Description:

Code 35 is set when the voltage the Sense Low input (terminal "A6") is between 61% and 78% of 36VLR output voltage for 500 milliseconds during the "Continuous Monitoring" tests performed by the DERM. The "Continuous Monitoring" tests are performed by the DERM after the initial "Turn-On" tests are completed and are performed every 100 milliseconds while "Ignition 1" voltage is present at the DERM. If one of the Discriminating Sensors is open the voltage at the Sense Low input will increase due to the increase in the resistance of the Discriminating Sensor section of the deployment loop and Code 35 will set.

Test Condition:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 35 will set if the voltage at the Sense Low input (terminal "A6") is between 61% and 78% of 36VLR output voltage for 500 milliseconds.

Conditions To Clear:

Current Code 35 will clear if the voltage at the Sense Low input (terminal "A6") is between 41% and 61% of 36VLR output voltage for 500 milliseconds.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

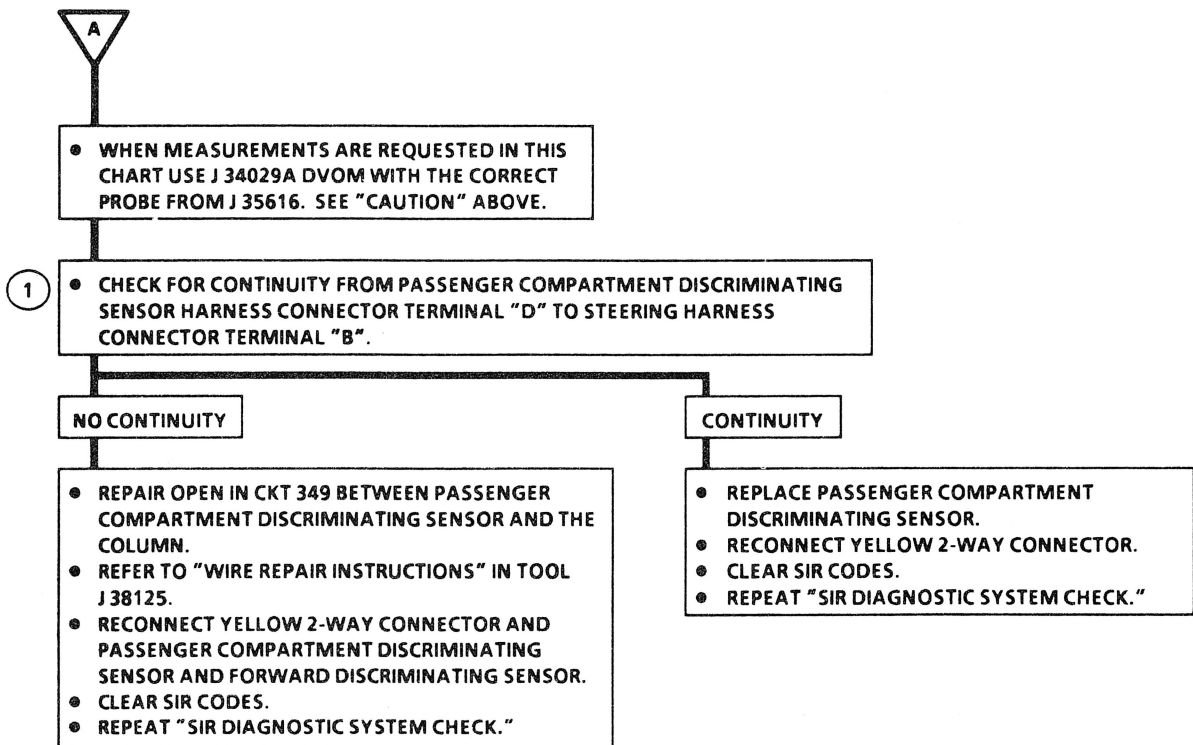
Note on Fault Tree:

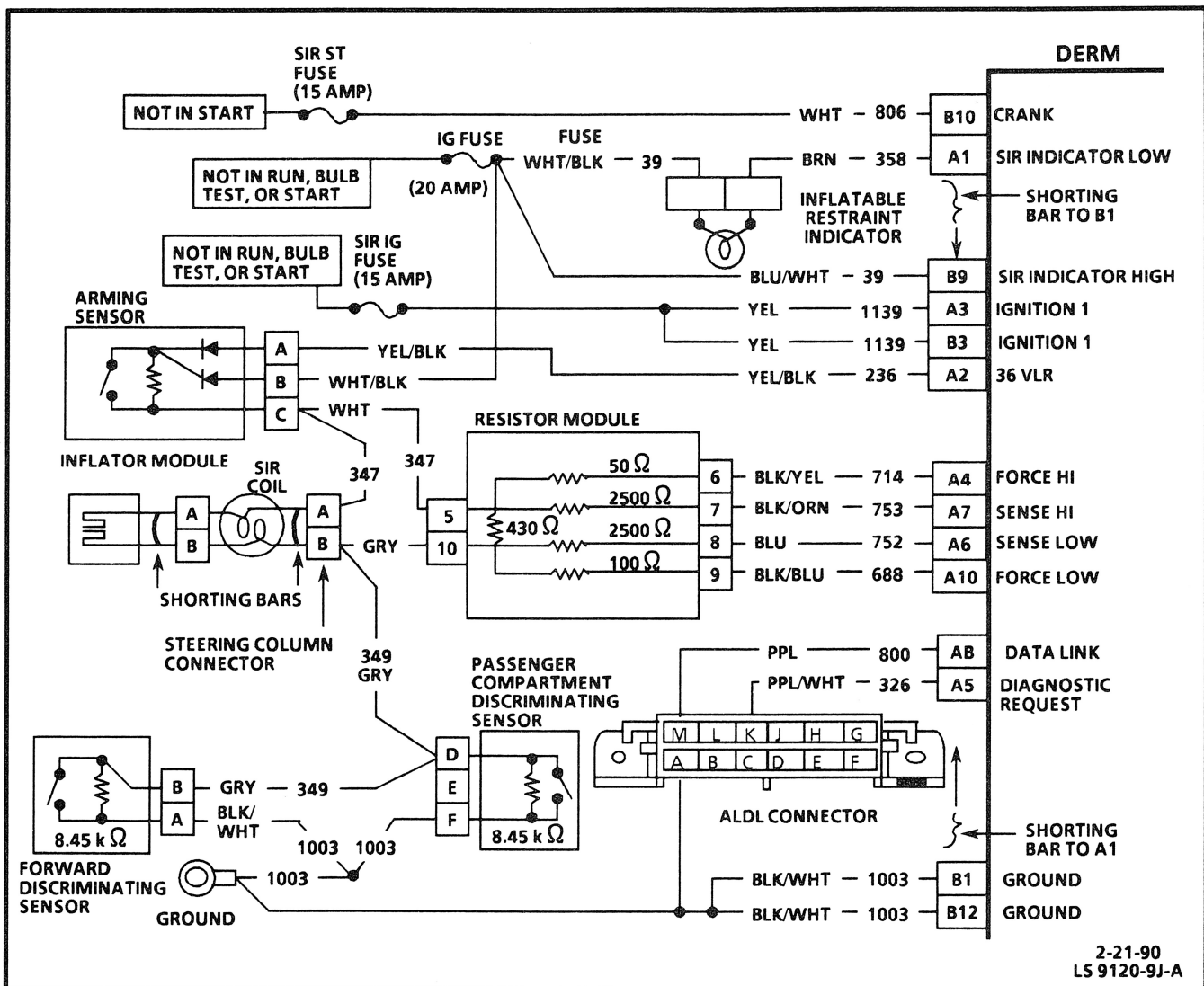
1. Checks for continuity in CKT 349.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 35 CHART 2 DISCRIMINATING SENSOR OPEN

CONTINUED FROM CODE 35 CHART 1





CODE 41

ENERGY RESERVE VOLTAGE CHARGING FAILURE

Description:

The DERM measures the deployment loop energy reserve voltage (36VLR) and checks that it has reached at least 28.4 volts within 7 seconds after "Ignition 1" voltage is applied to the DERM. Code 41 indicates an internal fault in the DERM or a resistive short to ground in the 36VLR circuit to the Arming Sensor.

Test Conditions:

Tested once during each ignition cycle at "Turn-On."

Failure Conditions:

Code 41 will set if the 36VLR output of the DERM has not reached at least 28.4 volts within 7 seconds after "Ignition 1" voltage is applied to the DERM.

Conditions To Clear:

Current Code 41 will be cleared each time the Ignition Switch is turned "OFF."

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

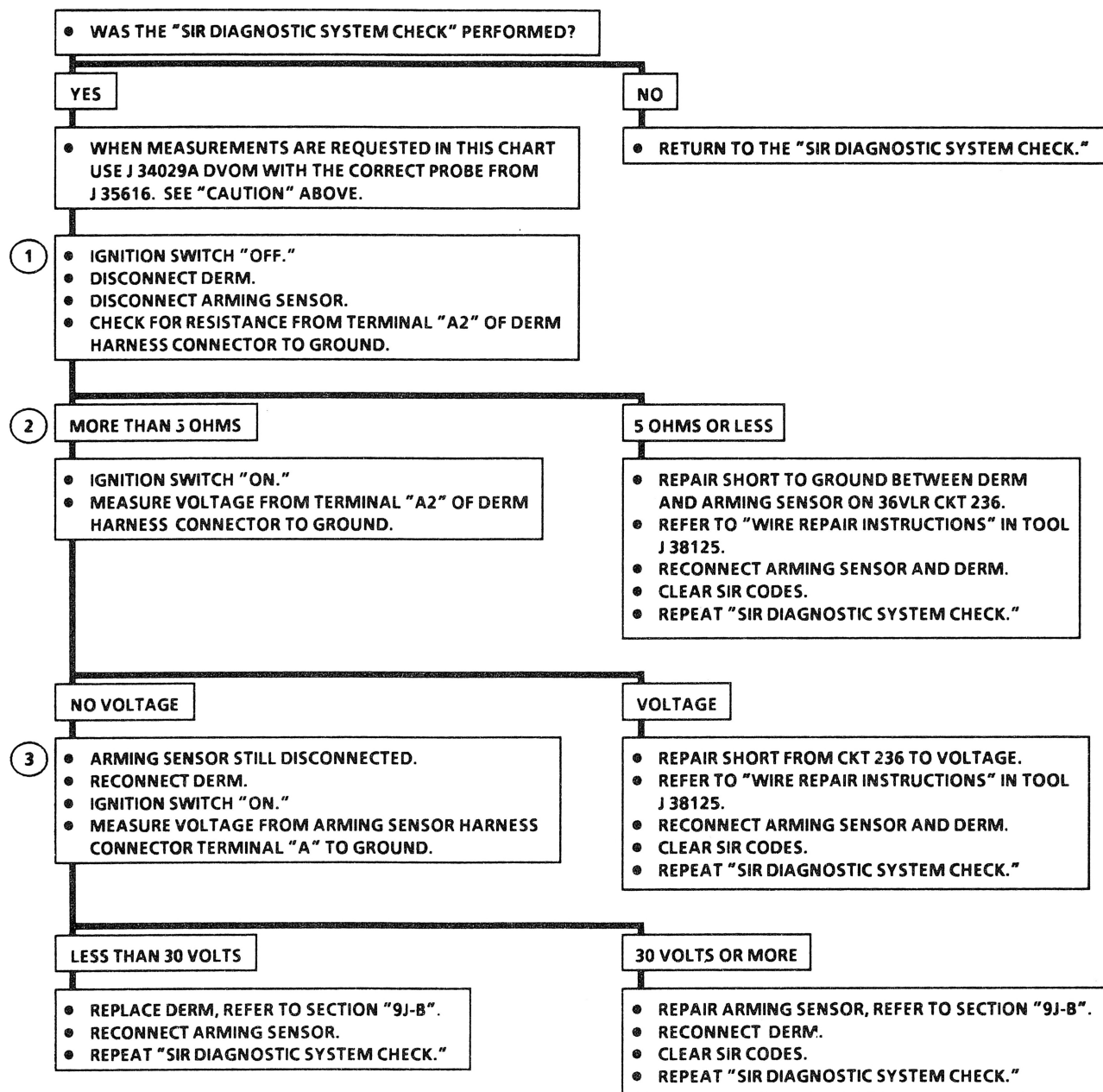
Notes on Fault Tree:

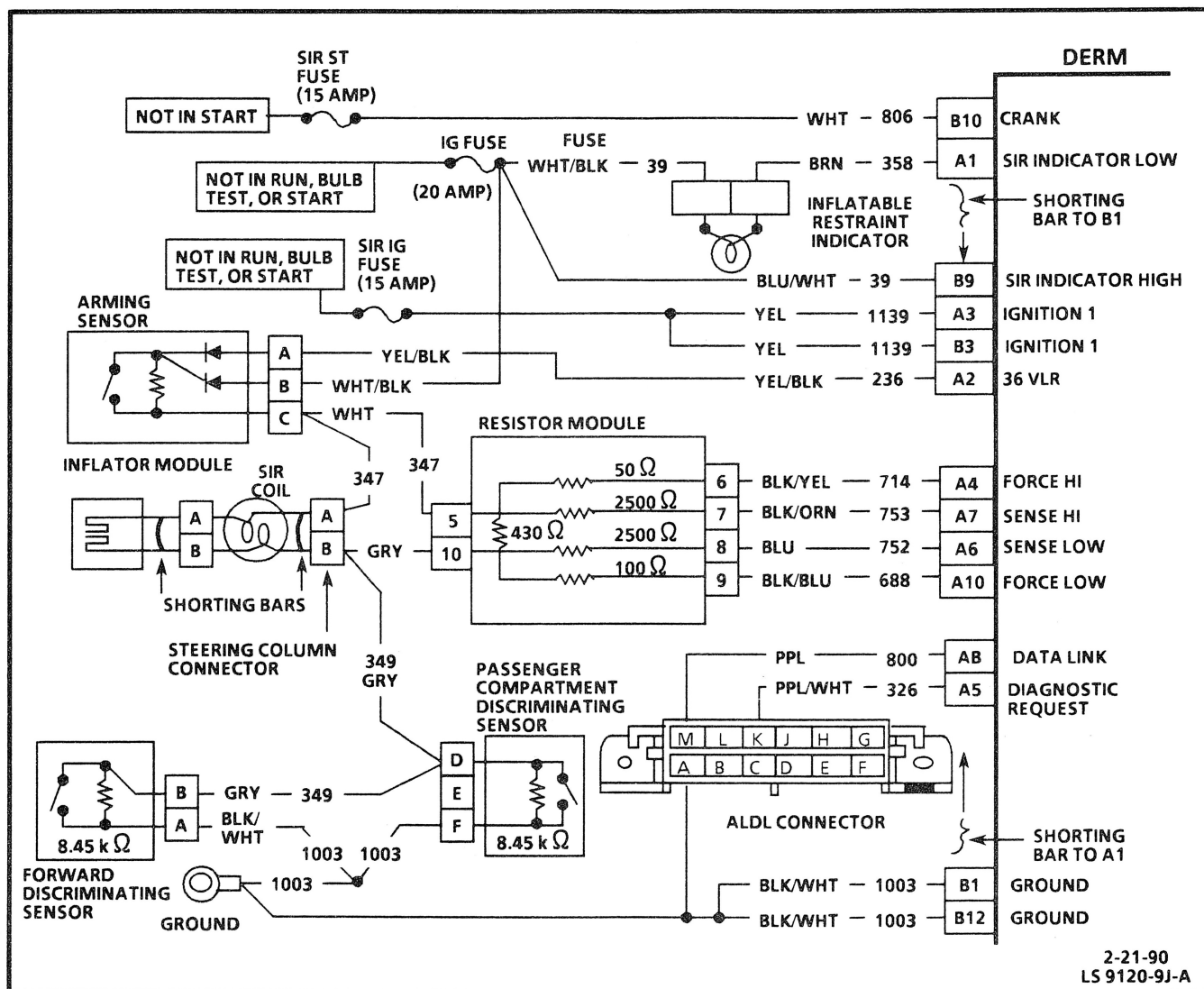
1. Checks for a short to system voltage on 36VLR circuit.
2. Checks for a resistive short to ground in the 36VLR circuit between the DERM and the Arming Sensor.
3. Checks for an open in the DERM or in CKT 236.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 41

ENERGY RESERVE VOLTAGE CHARGING FAILURE





CODE 42

ENERGY RESERVE VOLTAGE TOO LOW

Description:

The DERM measures the deployment loop energy reserve voltage (36VLR) and checks that it remains above 28.4 volts at all times after the initial charging of the reserve is completed (see Code 41). Code 42 indicates an internal fault in the DERM or a resistive short to ground in the 36VLR circuit to the Arming Sensor.

Test Condition:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 42 will set if the deployment loop energy reserve voltage (36VLR) is less than 28.4 volts for 500 milliseconds.

Conditions To Clear:

Code 42 will clear if the deployment energy reserve voltage (36VLR) is greater than 28.4 voltage for 500 milliseconds after Code 42 has set.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT" indicator lamp.

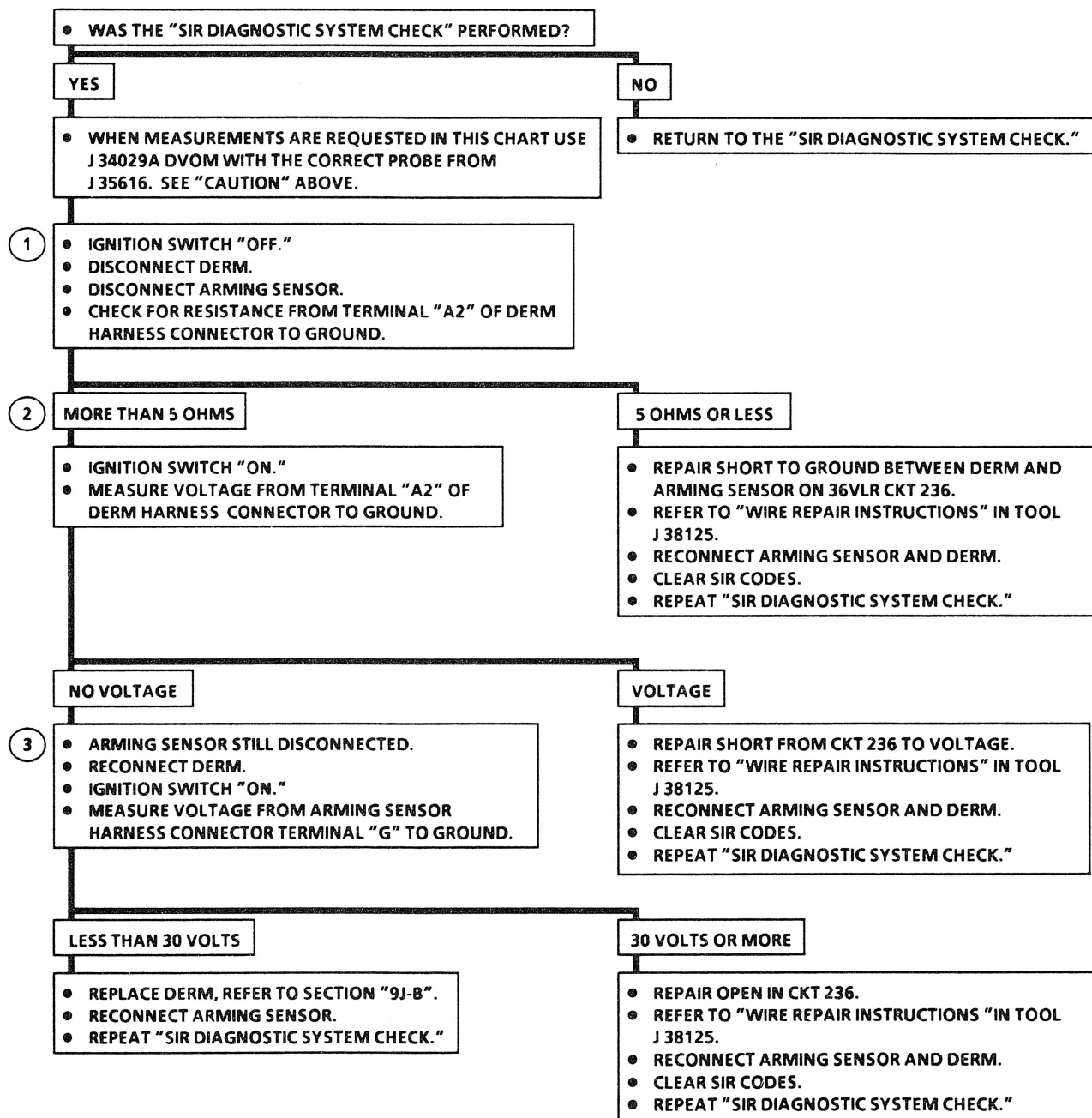
Notes on Fault Tree:

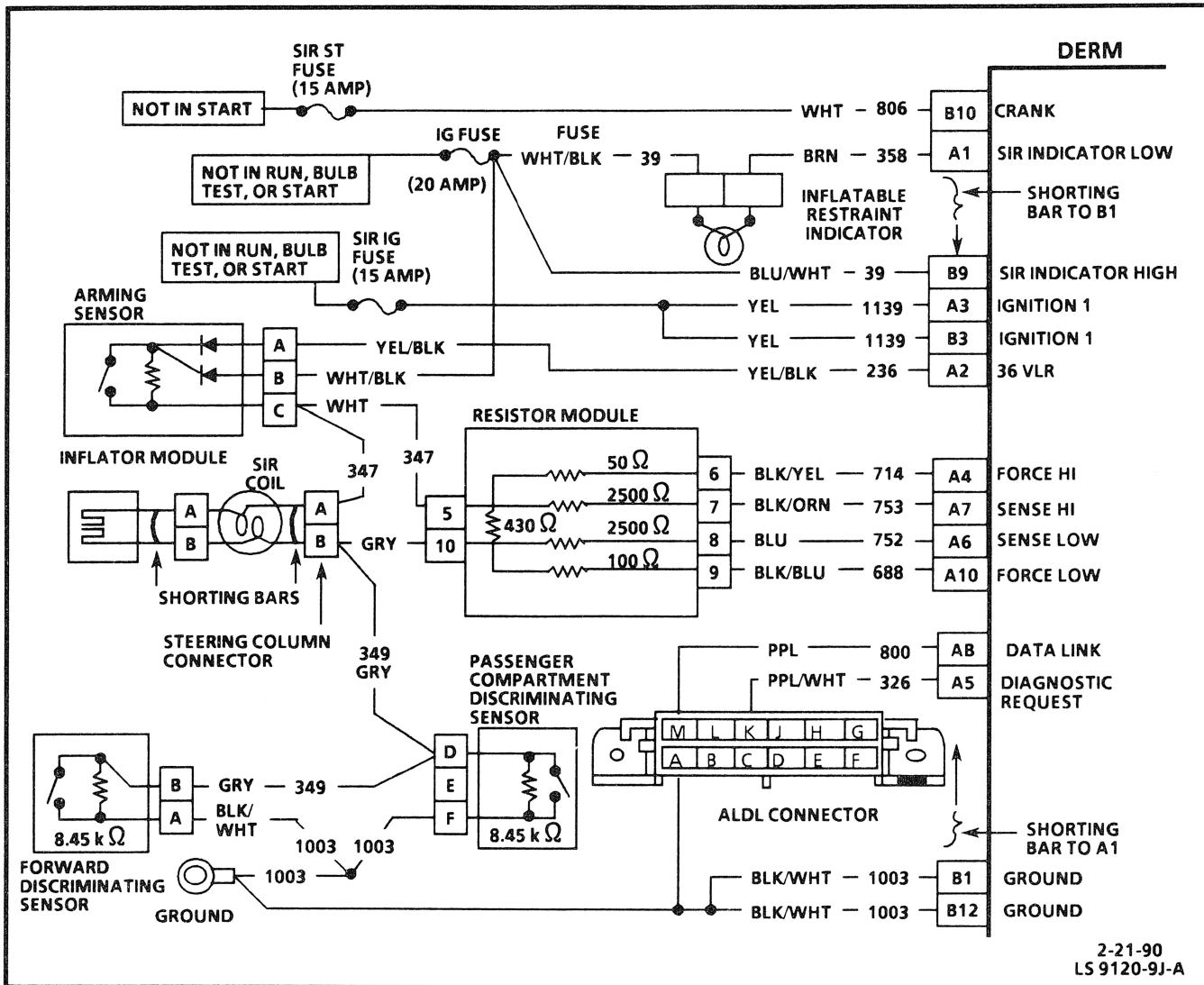
- Checks for a short to system voltage on 36VLR circuit.
- Checks for a resistive short to ground in the 36VLR circuit between the DERM and the Arming Sensor.
- Checks for an open in the DERM or in CKT 236.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 42

ENERGY RESERVE VOLTAGE TOO LOW





CURRENT CODE 51 ACCIDENT DETECTED

Description:

The DERM determines that the Arming Sensor is closed when system voltage or more is present at the "Sense Hi" input, and it determines that a Discriminating sensor is closed when it notes low voltage at the Sense Low input. There are some faults that may "look" like an accident to the DERM, and therefore record a Code 51. History Code 51 therefore is not proof that the vehicle was in an accident.

Test Condition:

DERM energy reserve voltage OK.

Failure Conditions:

Current Code 51 will set if the DERM senses that both the Arming Sensor and at least one of the Discriminating Sensors are closed simultaneously.

Conditions To Clear:

Current Code 51 can be cleared using a "Scan" tool clear codes command. *History Code 51 will remain in the DERM thereafter.*

Action Taken:

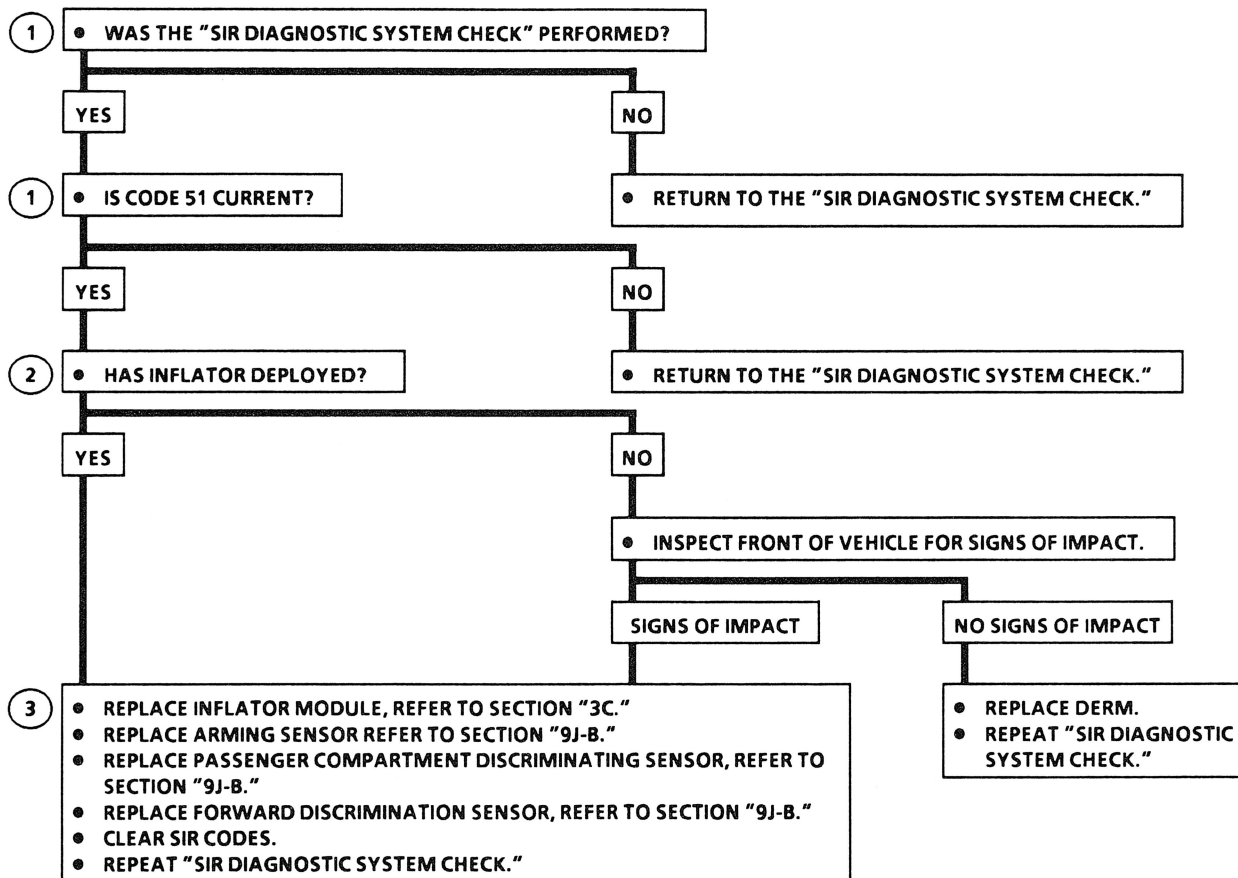
DERM turns "ON" the "INFLATABLE RESTRAINT" indicator until current Code 51 is cleared.

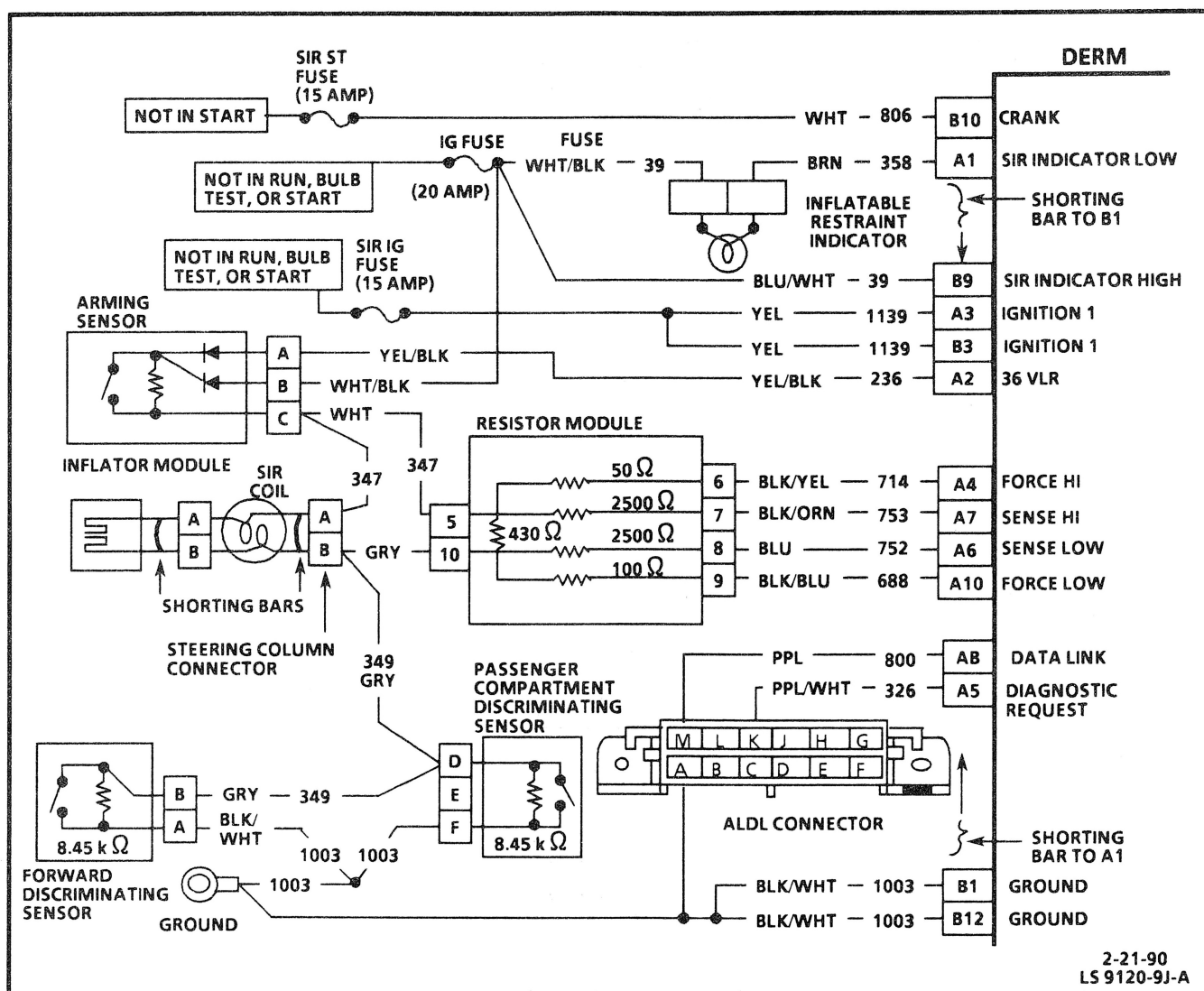
Notes on Fault Tree:

1. Incorrect diagnosis will occur if the SIR Diagnostic System Check is not performed.
2. If a Code 51 is current without signs of frontal impact and no deployment, then the code has set falsely and the DERM should be replaced.
3. *History Code 51 cannot be cleared* because the event of both the Arming Sensor and Discriminating Sensor being closed simultaneously is permanently stored in the EEPROM of the DERM.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CURRENT CODE 51 ACCIDENT DETECTED





CODE 52

EEPROM ACCIDENT DATA AREA FULL

Description:

When there is a vehicle accident of sufficient magnitude to set Code 51, the DERM stores accident information in the EEPROM. Code 52 is set when the EEPROM has stored 4 simultaneously closed Arming and Discriminating Sensor events (Code 51 settings).

Test Condition:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 52 will set when the EEPROM area reserved for accident data in the DERM is detected to be full during "Continuous Monitoring" for 100 milliseconds.

Conditions To Clear:

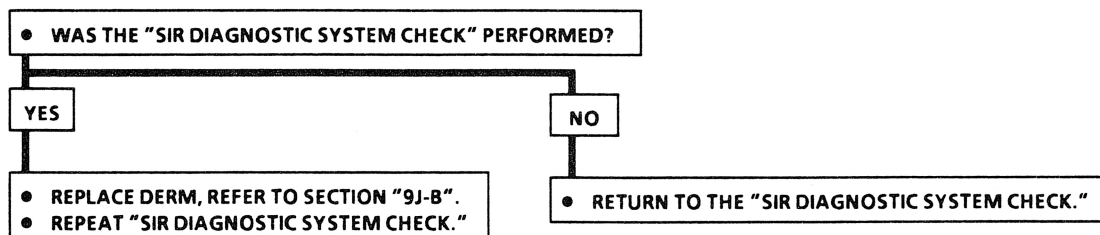
This code cannot be cleared.

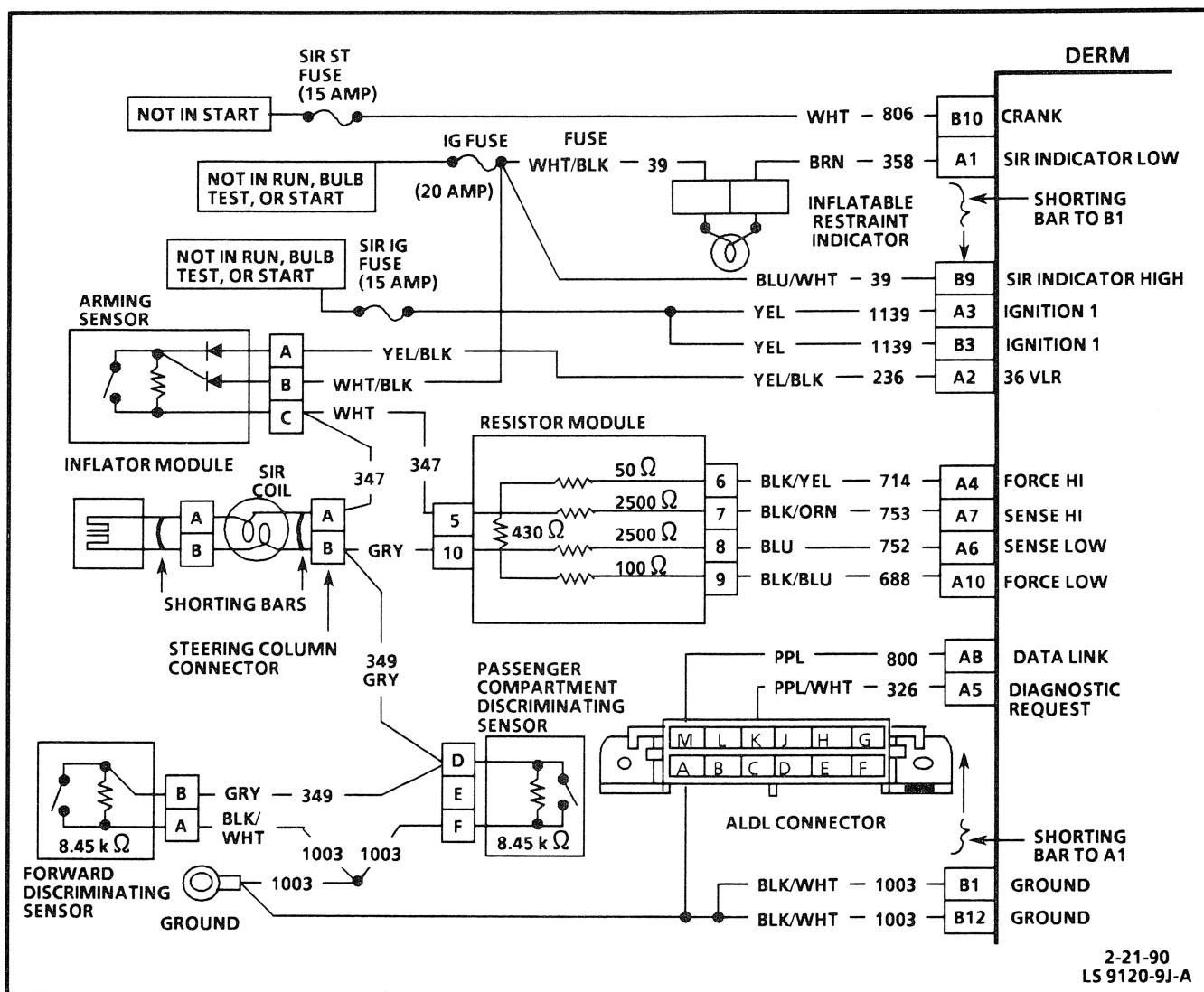
Action Taken:

"INFLATABLE RESTRAINT" indicator is turned "ON" during all future ignition cycles.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 52
EEPROM ACCIDENT
DATA AREA FULL





CODE 61

FORCE LOW OR "INFLATABLE RESTRAINT" INDICATOR CIRCUIT FAILURE

Description:

The DERM monitors the ground driver output by comparing the output state to the processor commanded state. Code 61 will set when the commanded state does not match the output state of the ground driver. A possible cause for a Code 61 is an open or short to ground in the Forced Low circuit.

Test Conditions:

Tested every 100 milliseconds during "Continuous Monitoring."

Failure Conditions:

Code 61 will set if: 1) Voltage at Sense Low input is greater than 8 volts; 2) Feedback from ground driver (QDM) does not agree with the commanded state for 500 milliseconds.

Conditions To Clear:

Current Code 61 will be cleared each time the Ignition Switch is turned "OFF."

Action Taken:

DERM attempts to turn "ON" the "INFLATABLE RESTRAINT" indicator.

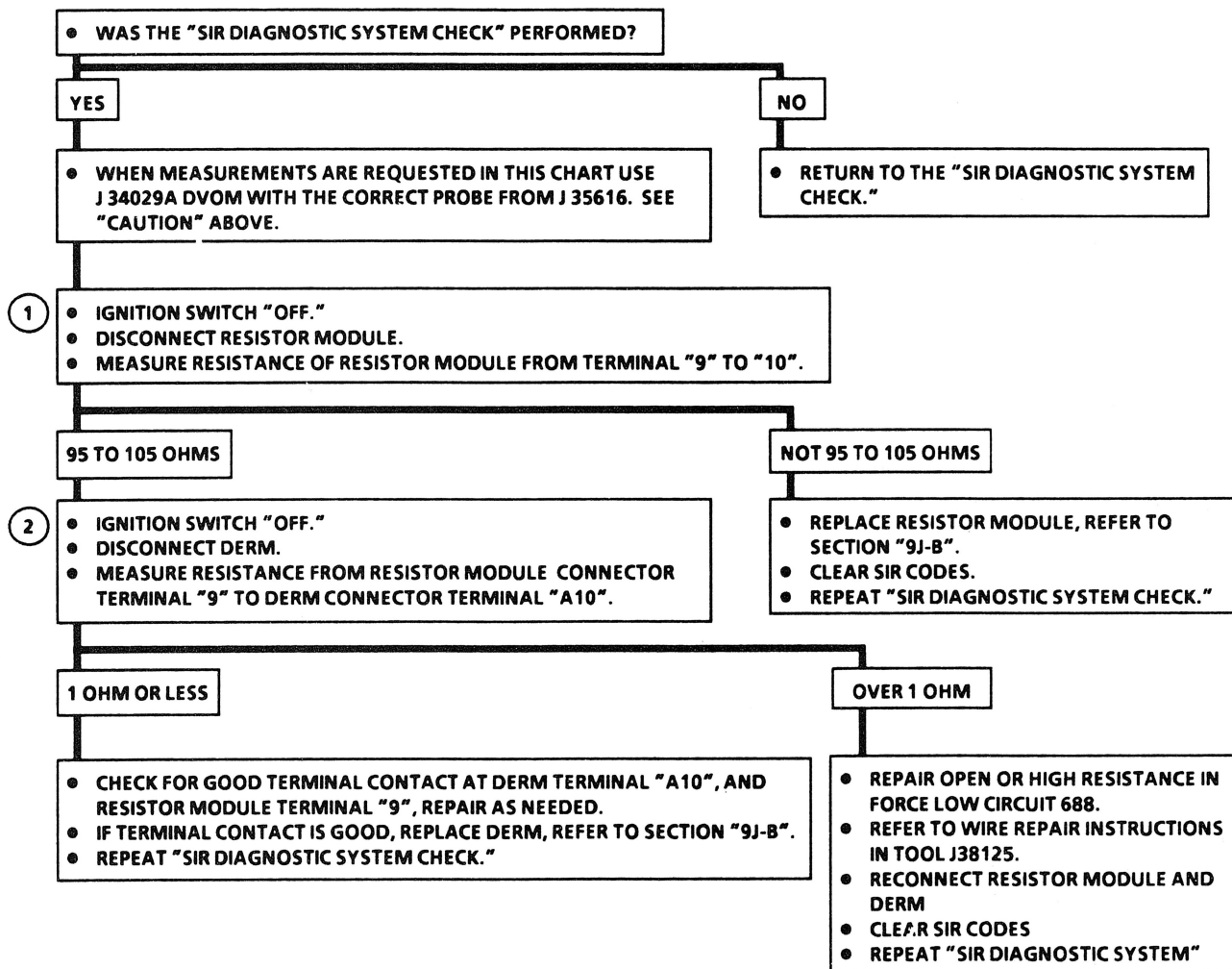
Notes on Fault Tree:

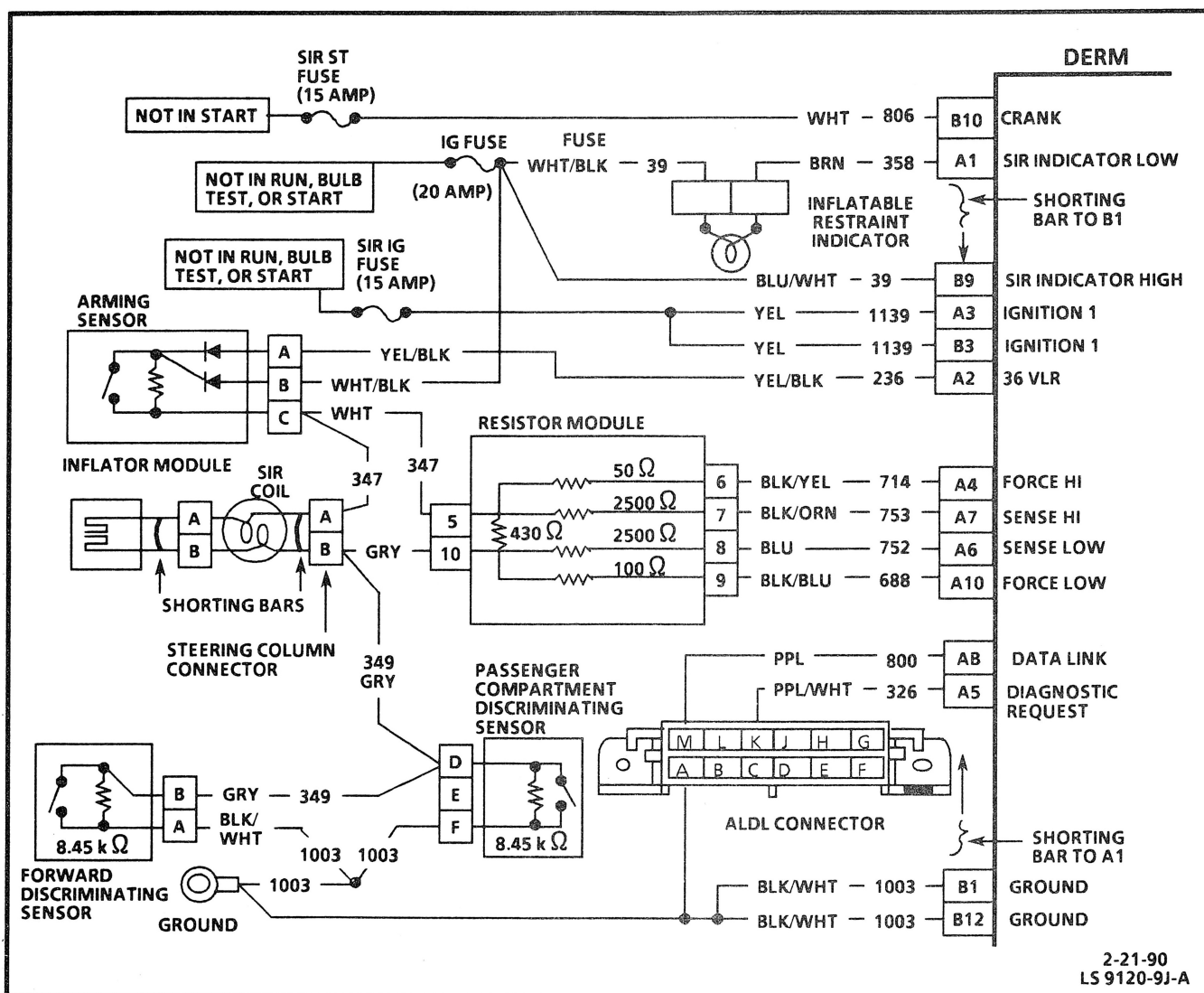
- Checks for an open 100 ohm resistor in the Resistor Module.
- Checks for an open between the Resistor Module and the DERM on the Force Low circuit.

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 61

FORCE LOW OR "INFLATABLE RESTRAINT" INDICATOR CIRCUIT FAILURE





CODE 71

INTERNAL DERM FAULT

Description:

Code 71 is an internal DERM fault and will set if one of the following conditions are detected: 1) DERM power supply reserve voltage charge or discharge time failure; 2) DERM power supply reserve voltage less than 13.0 volts or greater than 19.6 volts for 500 milliseconds; 3) DERM is unable to read from or write to EEPROM; 4) 36VLR is greater than 44.0 volts for 500 milliseconds.

Conditions To Clear:

Current Code 71 will clear if no internal DERM faults are detected for 500 milliseconds.

Action Taken:

DERM turns "ON" the "INFLATABLE RESTRAINT."

Test Conditions:

Tested during "Turn-On" and every 100 milliseconds during "Continuous Monitoring."

CAUTION: TO AVOID DEPLOYMENT WHEN TROUBLESHOOTING THE SIR SYSTEM DO NOT USE ELECTRICAL TEST EQUIPMENT, SUCH AS TEST LIGHTS, BATTERY POWERED OR A/C POWERED VOLTMETER, OHMMETER, ETC., OR ANY TYPE OF ELECTRICAL EQUIPMENT OTHER THAN SPECIFIED IN THIS MANUAL. INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED CAREFULLY, OTHERWISE PERSONAL INJURY MAY RESULT.

CODE 71 INTERNAL DERM FAULT

• WAS THE "SIR DIAGNOSTIC SYSTEM CHECK" PERFORMED?

YES

- REPLACE DERM, REFER TO SECTION "9J-B".
- REPEAT "SIR DIAGNOSTIC SYSTEM CHECK."

NO

- RETURN TO THE "SIR DIAGNOSTIC SYSTEM CHECK."

SECTION 9J-B

SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM REMOVAL AND INSTALLATION PROCEDURES

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: The procedures in this section must be followed in the order listed to temporarily disable the Supplemental Inflatable Restraint (SIR) System and prevent false diagnostic codes from setting. Failure to follow procedures could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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Service Procedures	9J-B-1	Diagnostic and Energy Reserve	
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Arming Sensor	9J-B-3		

SERVICE PROCEDURES

SERVICE PRECAUTIONS

The Diagnostic and Energy Reserve Module (DERM) can maintain sufficient voltage to cause a deployment for up to 10 minutes after the ignition switch is turned "OFF" and the battery is disconnected. Many of the service procedures require disconnection of the SIR IG Fuse and Inflator Module from the deployment loop to avoid an accidental deployment. Diagnostic procedures do not normally require fuse removal or disconnection of the Inflator Module. Always refer to GM service procedures for diagnosis.

Disabling the SIR System

Figure 1



Remove or Disconnect

- Turn ignition switch to "OFF."
- 1. SIR IG Fuse from the SIR fuse block.
- 2. Rear plastic access cover from inflator module housing.

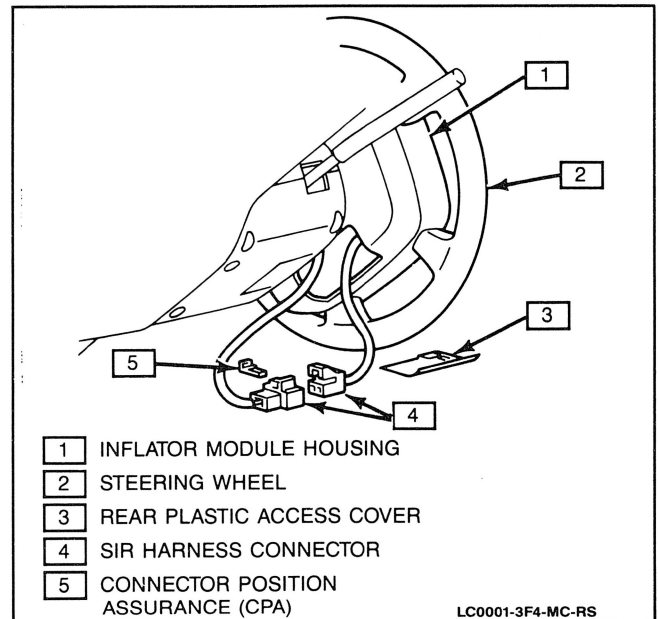


Figure 1 SIR Harness Connector

- 3. Connector position assurance (CPA) and yellow two-way connector inside the inflator module housing.

Enabling the SIR System

Figure 1

Install or Connect

- Turn the ignition switch to "OFF."
- 1. Yellow two-way connector and connector position assurance (CPA) inside the inflator module housing.
- 2. SIR IG Fuse to the SIR fuse block.
- 3. Rear plastic access cover to inflator module housing.
- Turn ignition switch to "RUN." Observe "INFLATABLE RESTRAINT" indicator lamp. If lamp does not flash 7 to 9 times and then remain off, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).

INSPECTIONS REQUIRED AFTER AN ACCIDENT

Important

- All SIR system components, including harnesses and brackets, must be inspected after an accident. If any are damaged or bent, they must be replaced even if a deployment did not occur. Inspect steering column and steering column support brackets and braces for damage. Do not attempt to repair the forward discriminating sensor, passenger compartment discriminating sensor, arming sensor, DERM, coil assembly or inflator module. Service is by replacement only. Any wire harness damage must be repaired only with the crimp and seal splice sleeves contained within the J 38125 Terminal Repair Kit. Verify replacement inflator module part number—some GM inflator modules look identical but contain different internal components.

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the passenger compartment discriminating sensor, arming sensor, forward discriminating sensor and the inflator module. Any visible damage to the sensors and/or their respective mounting brackets requires replacement, whether a deployment occurred or not.

WIRING REPAIR

Wiring repair procedures are included in ELECTRICAL DIAGNOSIS (SEC.8A) and SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM (SEC.9J) of this manual. When repairing any wiring associated with the SIR system, always use the crimp and seal splice sleeves contained within the J 38125 terminal repair kit.

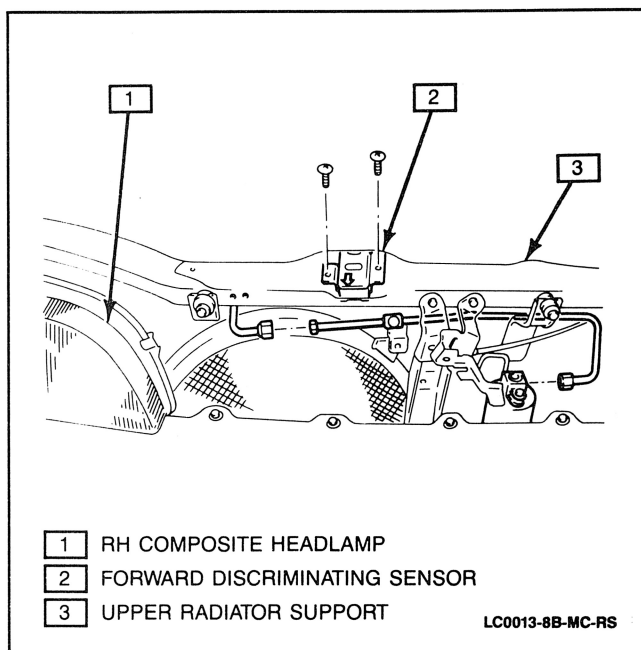


Figure 2 Forward Discriminating Sensor

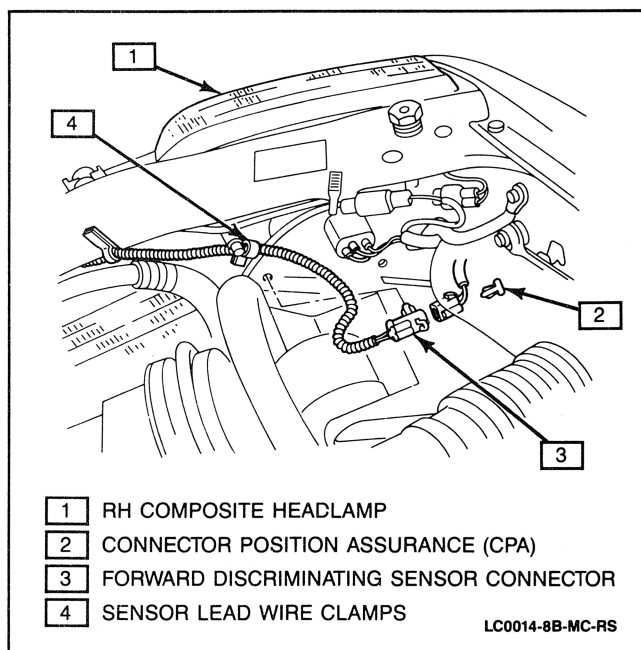


Figure 3 Forward Discriminating Sensor Connector

FORWARD DISCRIMINATING SENSOR

Figures 2 and 3

For a description of the Supplemental Inflatable Restraint System, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM (SEC.9J). For diagnosis of the Supplemental Inflatable Restraint System, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).

All sensors are specifically calibrated for each vehicle series and are keyed to the mounting brackets and the SIR wiring harness. Caution should be used to ensure proper location of the sensors to their mounting

brackets. The keying of the sensors to their mounting brackets and wiring harness should never be modified in the field.

CAUTION: Be very careful when handling a sensor. Never strike or jar a sensor. If you do, it could cause deployment and result in personal injury or improper operation of the Supplemental Inflatable Restraint (SIR) System. All sensor and mounting bracket bolts must be carefully torqued to ensure proper sensor operation. Never power up the SIR system when any sensor is not rigidly attached to the vehicle since the sensor is easily activated when not attached, and could result in deployment.



Remove or Disconnect

- Disable the SIR system. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.
- 1. Battery negative (-) cable.
- 2. Forward discriminating sensor connector from lamp support panel.
- 3. Connector position assurance (CPA) and sensor connector.
- 4. Two sensor lead wire clamps.
- 5. Accumulator outlet pipe (if vehicle is equipped with air conditioning). Refer to AIR CONDITIONING (SEC.1B) of the 1990 Geo Metro Service Manual.
- 6. Two bolts securing sensor to vehicle.
- 7. Sensor from vehicle.

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the passenger compartment discriminating sensor, arming sensor, forward discriminating sensor and the inflator module. Any visible damage to the sensors and/or their respective mounting brackets requires replacement, whether a deployment occurred or not.

CAUTION: Proper operation of the forward discriminating sensor requires the sensor and its bracket be rigidly attached to the vehicle structure and that the arrow on the sensor be pointing toward the front of the vehicle.



Install or Connect

1. Sensor to vehicle with arrow pointed towards the front of the vehicle; secure with 2 bolts.



Tighten

- Sensor mounting bolts to 11 N·m (98 lb.in.).
- 2. Accumulator outlet pipe (if vehicle is equipped with air conditioning). Refer to AIR CONDITIONING (SEC.1B) of the 1990 Geo Metro Service Manual.
- 3. Two sensor lead wire clamps.
- 4. Sensor electrical connector and CPA.
- 5. Forward discriminating sensor connector to lamp support panel.
- 6. Battery negative (-) cable.
- Enable the SIR system. Refer to "Enabling the SIR System" located under "Service Precautions" earlier in this section.

ARMING SENSOR

Figure 4

For a description of the Supplemental Inflatable Restraint System, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM (SEC.9J). For diagnosis of the Supplemental Inflatable Restraint System, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).

All sensors are specifically calibrated for each vehicle series and are keyed to the mounting brackets and the SIR wiring harness. Caution should be used to ensure proper location of the sensors to their mounting brackets. The keying of the sensors to their mounting brackets and wiring harness should never be modified in the field.

CAUTION: Be very careful when handling a sensor. Never strike or jar a sensor. If you do, it could cause deployment and result in personal injury or improper operation of the Supplemental Inflatable Restraint (SIR) System. All sensors and mounting bracket bolts must be carefully torqued to ensure proper sensor operation. Never power up the SIR system when any sensor is not rigidly attached to the vehicle since the sensor is easily activated when not attached, and could result in deployment.



Remove or Disconnect

- Disable the SIR system. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.
- 1. Battery negative (-) cable.
- 2. One screw and glove box upper panel from instrument panel.
- 3. Connector position assurance (CPA) and yellow electrical connector. Access through glove box opening.
- 4. Two sensor mounting bolts and arming sensor from vehicle.

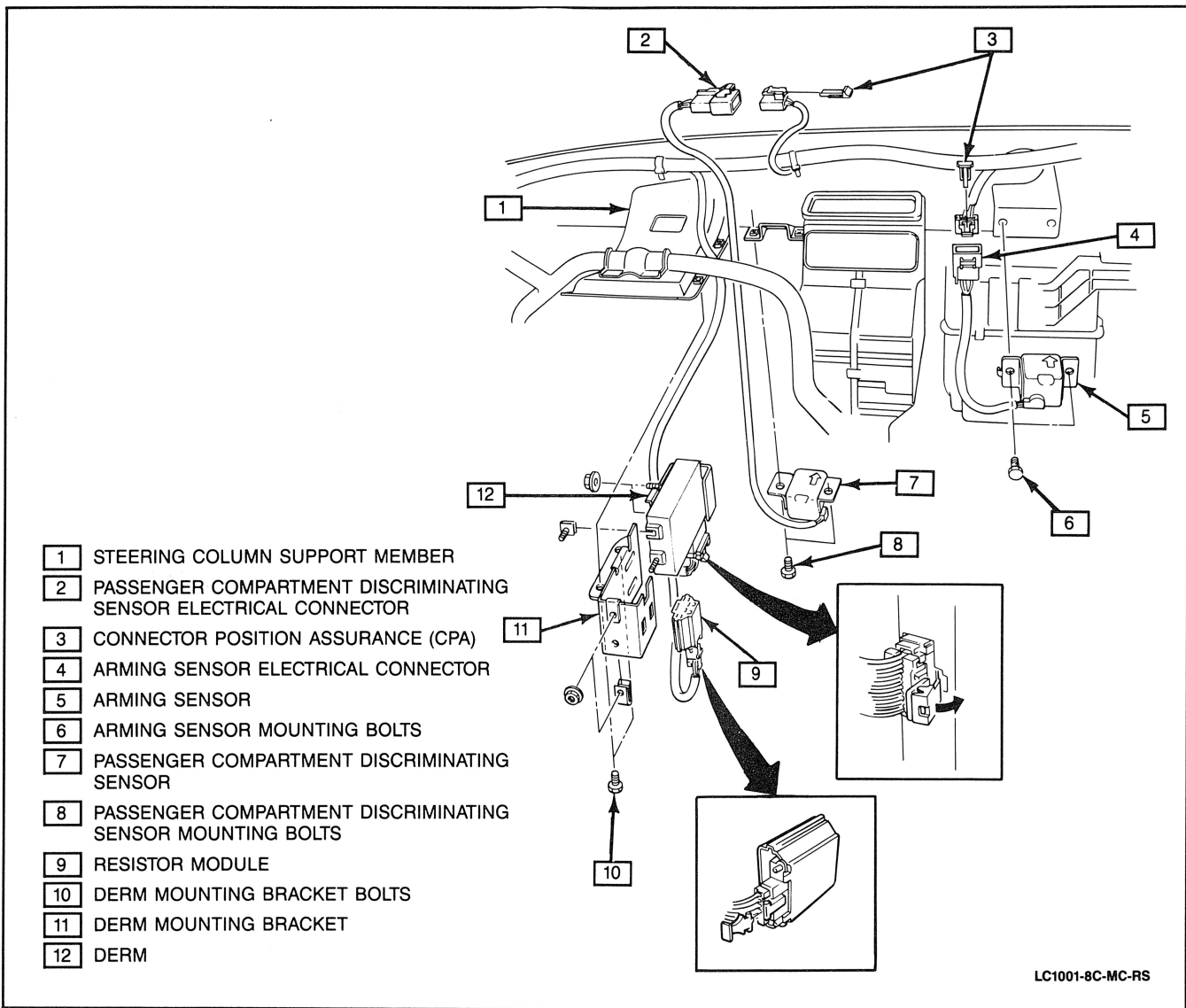


Figure 4 SIR Underdash Components

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the passenger compartment discriminating sensor, arming sensor, forward discriminating sensor and the inflator module. Any visible damage to the sensors and/or their respective mounting brackets requires replacement, whether a deployment occurred or not.

CAUTION: Proper operation of the arming sensor requires that the sensor assembly be rigidly attached to its bracket with the two bolts at the flanges of the sensor. The arrow must be pointing toward the front of the vehicle.

Install or Connect

1. Arming sensor to vehicle with the arrow pointing to the front of the vehicle.
2. Two sensor mounting bolts.

Tighten

- Arming sensor mounting bolts to 6 N·m (53 lb.in.).
- 3. Sensor electrical connector and CPA.
- 4. Glove box upper panel; secure with 1 screw.
- 5. Battery negative (-) cable.
- Enable the SIR system. Refer to "Enabling the SIR System" located under "Service Precautions" earlier in this section.

DIAGNOSTIC AND ENERGY RESERVE MODULE (DERM) AND RESISTOR MODULE

Figure 4

For a description of the Supplemental Inflatable Restraint System, refer to SUPPLEMENTAL

INFLATABLE RESTRAINT SYSTEM (SEC.9J). For diagnosis of the Supplemental Inflatable Restraint System, refer to **SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).**

Remove or Disconnect

- Disable the SIR system. Refer to “Disabling the SIR System” located under “Service Precautions” earlier in this section.
- 1. Battery negative (-) cable.
- 2. Orange connector lock and DERM electrical connector.
- 3. Connector position assurance (CPA) and resistor module electrical connector.
- 4. Two screws and DERM mounting bracket from steering column support member. Access from under instrument panel, on the right side of the steering column.
- Unsnap and remove resistor module from DERM mounting bracket.
- 5. Four nuts and DERM from mounting bracket.

Install or Connect

1. DERM to mounting bracket, securing with 4 nuts.
2. Resistor module to DERM mounting bracket; snap into place.
3. DERM mounting bracket to steering column support member; secure with 2 screws.
4. Resistor module electrical connector and CPA.
5. DERM electrical connector and orange connector lock.
6. Battery negative (-) cable.
- Enable the SIR system. Refer to “Enabling the SIR System” located under “Service Precautions” earlier in this section.

PASSENGER COMPARTMENT DISCRIMINATING SENSOR

Figure 4

For a description of the Supplemental Inflatable Restraint System, refer to **SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM (SEC.9J).** For diagnosis of the Supplemental Inflatable Restraint System, refer to **SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).**

All sensors are specifically calibrated for each vehicle series and are keyed to the mounting brackets and the SIR wiring harness. Caution should be used to ensure proper location of the sensors to their mounting brackets. The keying of the sensors to their mounting brackets and wiring harness should never be modified in the field.

CAUTION: Be very careful when handling a sensor. Never strike or jar a sensor. If you do, it could cause deployment and result in personal injury or improper operation of the Supplemental Inflatable Restraint

(SIR) System. All sensors and mounting bracket bolts must be carefully torqued to ensure proper sensor operation. Never power up the SIR system when any sensor is not rigidly attached to the vehicle since the sensor is easily activated when not attached, and could result in deployment.

Remove or Disconnect

- Disable the SIR system. Refer to “Disabling the SIR System” located under “Service Precautions” earlier in this section.
- 1. Battery negative (-) cable.
- 2. Connector position assurance (CPA) and sensor electrical connector. Access from under instrument panel, on the right side of the steering column.
- 3. Two sensor mounting bolts and passenger compartment discriminating sensor from vehicle.

CAUTION: Proper operation of the sensors and Supplemental Inflatable Restraint (SIR) System requires that any repairs to the vehicle structure return it to its original production configuration. Deployment (Current Code 51) requires, at a minimum, replacement of the passenger compartment discriminating sensor, arming sensor, forward discriminating sensor and the inflator module. Any visible damage to the sensors and/or their respective mounting brackets requires replacement, whether a deployment occurred or not.

CAUTION: Proper operation of the passenger compartment discriminating sensor requires that the sensor assembly be rigidly attached to its bracket with the two bolts at the flanges of the sensor. The arrow must be pointing toward the front of the vehicle.

Install or Connect

1. Passenger compartment discriminating sensor to vehicle with the arrow pointing toward the front of the vehicle.
2. Two sensor mounting bolts.

Tighten

- Passenger compartment discriminating sensor mounting bolts to 6 N·m (53 lb.in.).
- 3. Sensor electrical connector and CPA.
- 4. Battery negative (-) cable.
- Enable the SIR system. Refer to “Enabling the SIR System” located under “Service Precautions” earlier in this section.

KNEE BOLSTER

Remove or Disconnect

- Disable the SIR system. Refer to “Disabling the SIR System” located under “Service Precautions” earlier in this section.
- 1. Battery negative (-) cable.
- 2. Instrument panel. Refer to INSTRUMENT PANEL, CONSOLE AND GAGES (SEC.8C).
- 3. Five screws and knee bolster from instrument panel support member.

Install or Connect

1. Knee bolster to support member; secure with 5 screws.
2. Instrument panel. Refer to INSTRUMENT PANEL, CONSOLE AND GAGES (SEC.8C).
3. Battery negative (-) cable.
- Enable the SIR system. Refer to “Enabling the SIR System” located under “Service Precautions” earlier in this section.

SPECIFICATIONS

FASTENER TORQUES

Arming Sensor Mounting Bolts	6 N·m (53 lb.in.)
Forward Discriminating Sensor Mounting Bolts	11 N·m (98 lb.in.)
Passenger Compartment Discriminating Sensor Mounting Bolts.....	6 N·m (53 lb.in.)

SECTION 10-3

UNDERBODY

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above conditions are not followed, parts or system damage could result.

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General Body Construction	10-3-1	Floor Carpet	10-3-3
On-Vehicle Service	10-3-1	Underbody Dimensions	10-3-3
Alignment Checking	10-3-1	Specifications	10-3-3
Underbody	10-3-1	Fastener Torques	10-3-3

GENERAL DESCRIPTION

GENERAL BODY CONSTRUCTION

Information in this section pertains to unitized body construction which incorporates integral front and rear frame side rails.

The engine, front suspension lower control arms and rack and pinion steering mount assembly are supported by an engine cradle. The engine cradle, in turn, is bolted to the body through rubber insulators at four locations. In addition, two rubber insulated struts secure the engine to the upper rail of the engine compartment front panel. The engine compartment front panel is a component of the body structure.

Mounting provisions for the front suspension system are shared by chassis components (suspension lower control arms and engine cradle) and body components (engine compartment side panels). The suspension strut towers must be dimensionally correct in relation to the remainder of the underbody in order to maintain specified suspension strut and caster/camber angles.

Since the individual underbody components also contribute directly to the overall strength of the body, it is essential that proper welding techniques be observed during service repair operations. The underbody components should be properly sealed and rustproofed whenever body repair operations destroy or damage the original sealing and rustproofing. When rustproofing critical underbody components, it is essential to use a quality type of air dry primer such as corrosion-resistant chromate or equivalent material. Combination type primer-surfaces are not recommended.

ON-VEHICLE SERVICE

ALIGNMENT CHECKING

Underbody

An accurate method of determining the alignment of the underbody utilizes a measuring tram gage. The tram gage set require to perform the recommended measuring checks must include a vertical pointer capable of reaching 914 mm (36 inches).

Two types of measurements can be made with a tram gage: direct point-to-point measurements and measurements calculated on a horizontal plane (datum line) parallel to the underbody. In the latter case, the height or vertical pointers must be set as specified for each point to be measured.

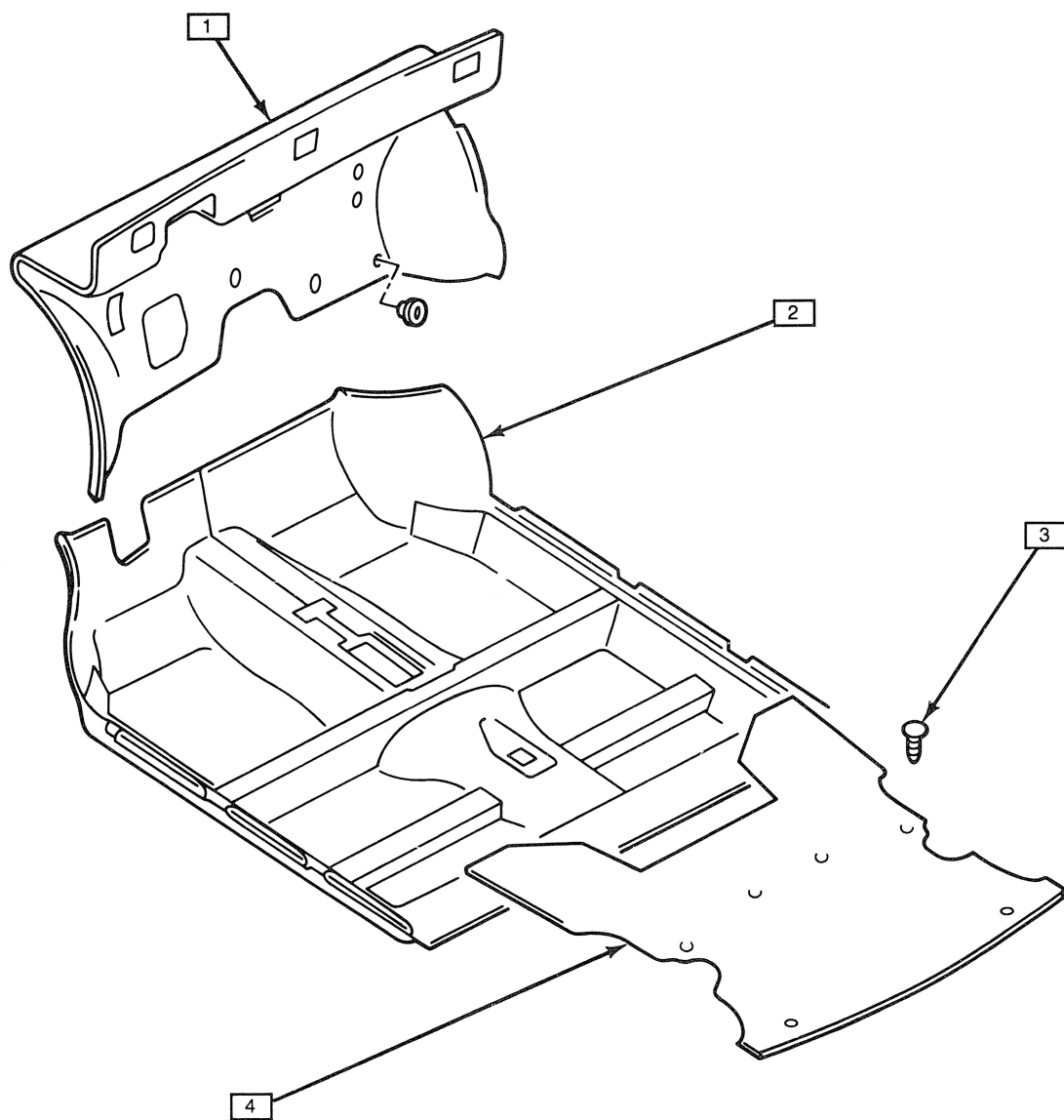
Point-to-point measurements are generally taken on front structure steering and suspension components and simply require the vertical pointers to be equally set. In some cases point-to-point measurements may be directly taken with a tape measure or appropriate measuring tool.

Dimensions-to-gage holes are measured to the leading edge or center of the holes and flush to adjacent surface metal. The alphabetically identified points of measurement are given in Figures 2 through 4.

FLOOR PAN INSULATORS

Figure 1

Floor pan insulators have been designed for higher floor pan temperatures that result from the use of the catalytic converter in the exhaust system. Therefore, when servicing a vehicle in the field, it is essential that any insulators that may have been



- 1 DASH PANEL INSULATION
- 2 FRONT FLOOR CARPET
- 3 CLIP
- 4 LUGGAGE FLOOR CARPET

LC0001-10-3-MC-RS

Figure 1 Floor Carpet

disturbed or removed be reinstalled in the original sequence and location. Also, if it becomes necessary to replace an insulator, the material specified for that particular location on the floor pan must be used.

All of the above materials must meet Motor Vehicle Safety Standard No. 302 for flammability.

When servicing or replacing interior insulators, the following instructions must be observed:

- Insulators must be installed in the original position and sequence. Pieces should be butted together in order to avoid gapping or overlapping.
- If it is necessary to replace an insulator, the specific material must be used.
- Use the original part to determine the amount of replacement material required and as a template for cutting and fitting the new piece to the floor pan.
- When installing the insulator, do not enlarge cutouts or holes that are used for the attachment of interior components such as seats or safety belts.
- Cross body harnesses for interior components such as power seats, safety belt warning light and alarm, or rear speakers must be routed over the floor pan insulators in the original location and clipped in place.
- Spray-on deadeners and trim adhesives should not be applied to the top of the floor pan at the area directly over the catalytic converter or muffler.
- Any insulator service repair or replacement should be the same thickness, size, and location as the original installation in the vehicle.

FLOOR CARPET

Figure 1



Remove or Disconnect

1. Right and left front seats. Refer to SEATS (SEC. 10-10).
2. Four plastic retainers and right-side sill plate.
3. Four plastic retainers and left-side sill plate.
4. Left and right-side kick panels.

5. Left-side safety belt lower anchor bolt.
6. Right-side safety belt lower anchor bolt.
7. Console assembly. Refer to INSTRUMENT PANEL, CONSOLE AND GAGES (SEC.8C).
8. Rear quarter trim. Refer to REAR QUARTERS (SEC.10-7).
9. Floor carpet from vehicle.



Install or Connect

1. Floor carpet into vehicle.
2. Rear quarter trim. Refer to REAR QUARTERS (SEC.10-7).
3. Console assembly. Refer to INSTRUMENT PANEL, CONSOLE AND GAGES (SEC.8C).
4. Right-side safety belt lower anchor bolt.



Tighten

- Right-side safety belt lower anchor bolt to 45 N·m (33 lb.ft.).
5. Left-side safety belt lower anchor bolt.



Tighten

- Left-side safety belt lower anchor bolt to 45 N·m (33 lb.ft.).
6. Right-side kick panel.
 7. Left-side kick panel.
 8. Left-side sill plate; secure with four plastic fasteners.
 9. Right-side sill plate; secure with four plastic fasteners.
 10. Right and left front seats. Refer to SEATS (SEC. 10-10).

UNDERBODY DIMENSIONS

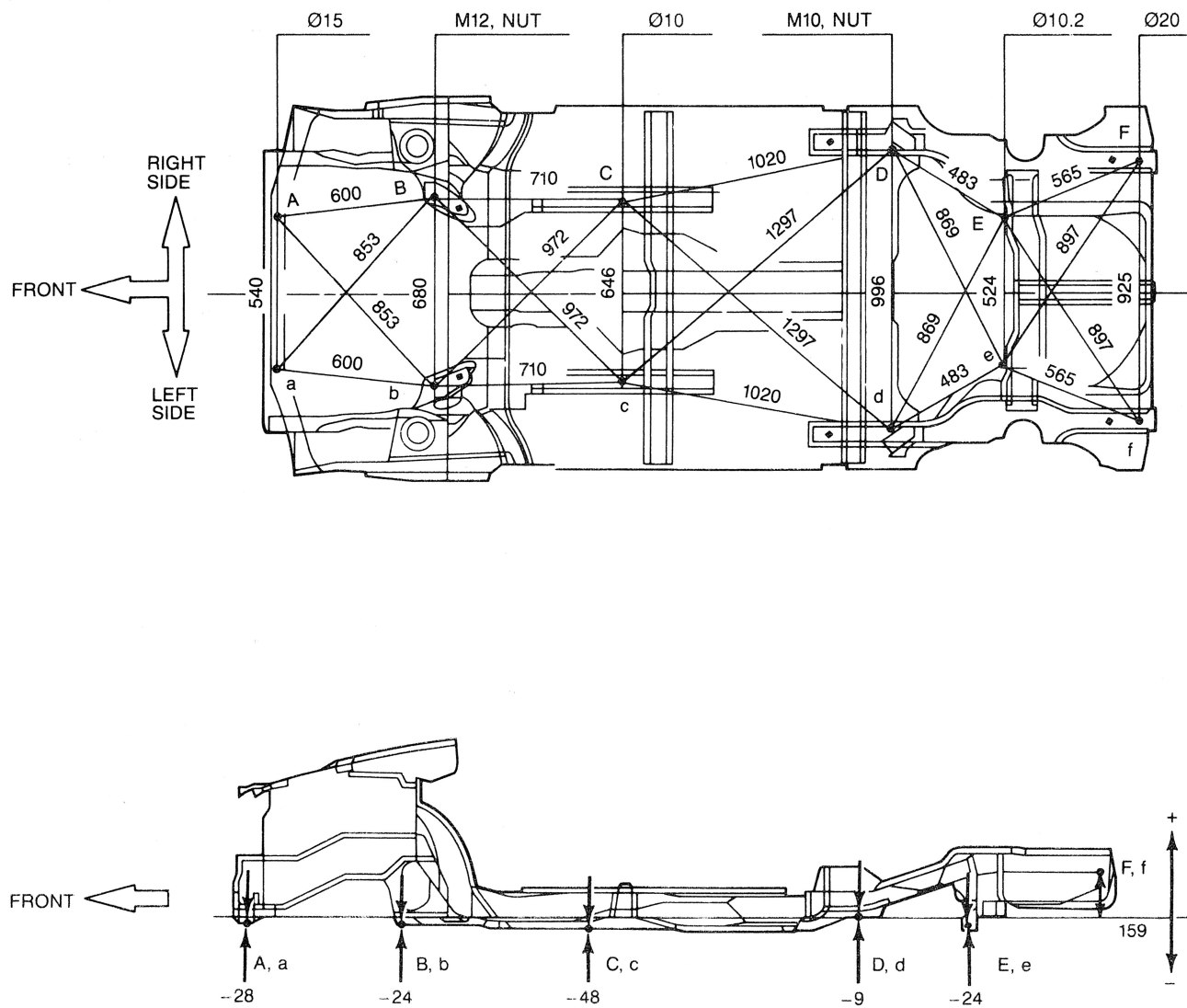
Figures 2 through 4

Each underbody component affects the strength of the vehicle itself as well as the wheel alignment (toe-in, camber, caster). It is essential, therefore, to inspect the underbody carefully after completing any underbody repairs (welding, etc.). Refer to GENERAL BODY SERVICE PROCEDURES (SEC.10-1) of the 1990 Geo Metro Service Manual for sealing and rustproof treatment information.

SPECIFICATIONS

FASTENER TORQUES

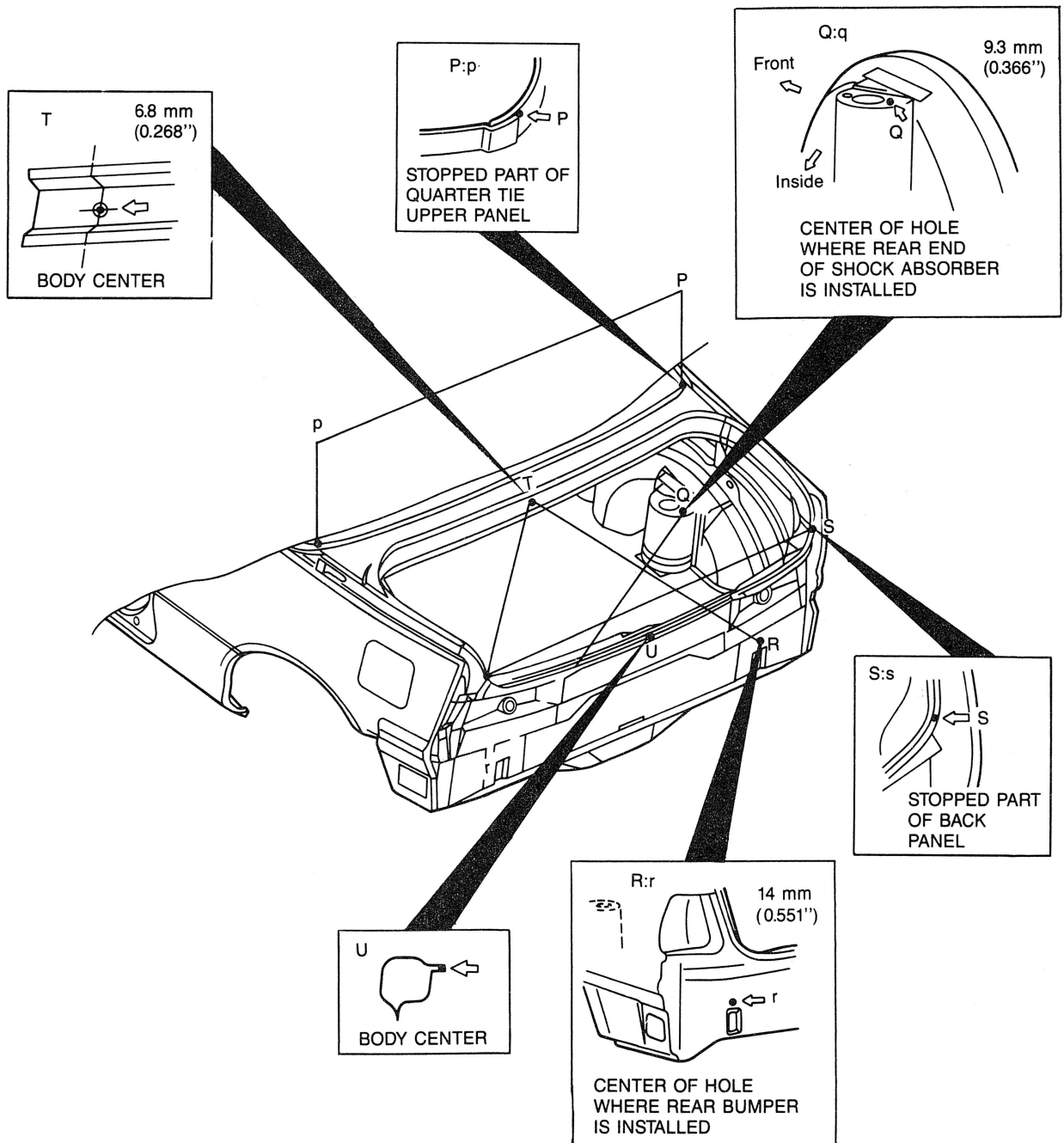
Safety Belt Lower Anchor Bolts45 N·m (33 lb.ft.)



- ALL DIMENSIONS ARE IN MILLIMETERS (mm)
- ALL CONTROL POINTS ARE SYMMETRICAL SIDE-TO-SIDE
- ALL TOLERANCES ARE $\pm 3\text{mm}$

LC0002-10-3-MC-RS

Figure 2 Underbody Dimensions



MEASUREMENT POSITION	DISTANCE BETWEEN POINTS
P — p	1315 mm (51.77'')
Q — r	1068 mm (42.05'')
S — s	1165 mm (45.87'')
T — s	735 mm (28.94'')
T — U	511 mm (20.12'')

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Figure 3 Body Dimensions (1 of 2)

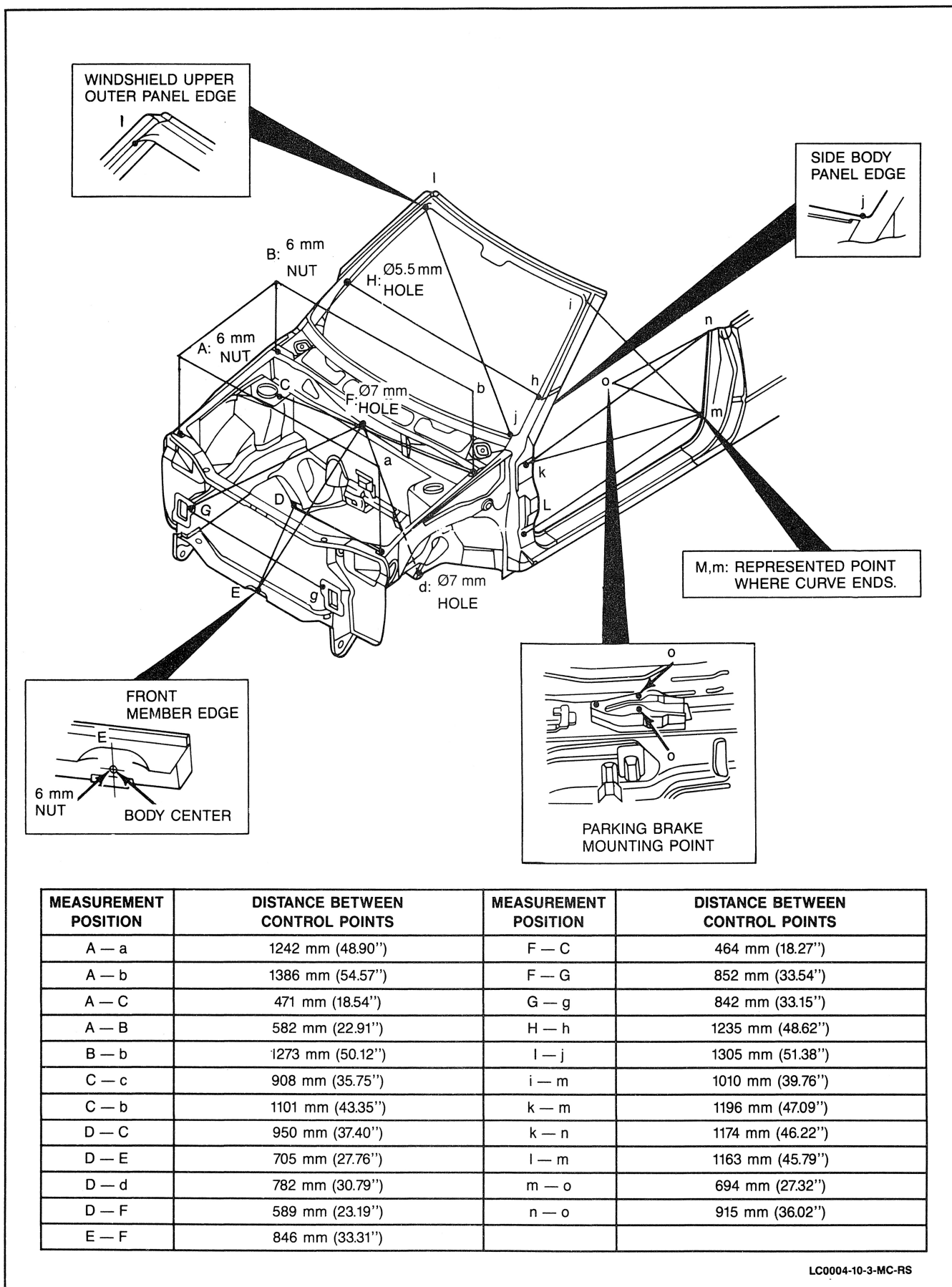


Figure 4 Body Dimensions (2 of 2)

SECTION 10-5

BODY FRONT END

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: The procedures in this Section must be followed in the order listed to temporarily disable the Supplemental Inflatable Restraint (SIR) System and prevent false diagnostic codes from setting. Failure to follow procedures could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

NOTICE: Anticorrosion materials have been applied to the interior surfaces of some metal panels to provide rust resistance. When servicing these panels, areas on which this material has been disturbed should be properly recoated with service-type anticorrosion material.

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GENERAL DESCRIPTION

This section contains information necessary for servicing the area of the vehicle forward of the passenger compartment. Specific areas of service are front end sealing, hood, front wheel housing, exterior moldings, front body panel alignment, and antenna.

LUBRICATION

Hood hinges and locking mechanisms require periodic lubrication. Refer to MAINTENANCE AND LUBRICATION (SEC.0B) of the 1990 Geo Metro Service Manual for specific types and intervals of lubrication.

FASTENERS

Many aluminum components are used on present models. Aluminum in contact with steel may corrode rapidly if not protected by special finishes or isolators.

The fasteners have a special finish meeting GM specification, GM6111M (gray) and GM6047 (black), which provides adequate protection from corrosion. These special fasteners differ in color in order to more easily identify them from the standard metric fasteners, which are medium blue in color. When replacing fasteners, avoid substituting otherwise similar fasteners in locations which require the use of GM6111M or

GM6047 type special fasteners for aluminum components.

NOTICE: Failing to follow this precaution may result in premature corrosion of sheet metal in the areas mentioned above.

ANTICORROSION MATERIALS

Anticorrosion material has been applied to the interior surfaces of most metal panels to provide rust resistance. When servicing these panels, areas on which this material has been disturbed should be properly recoated with service-type anticorrosion material.

ON-VEHICLE SERVICE

SERVICE PRECAUTIONS

The DERM can maintain sufficient voltage to cause a deployment for up to 10 minutes after the Ignition Switch is turned "OFF" and the battery is disconnected. Many of the service procedures require disconnection of the SIR IG Fuse and Inflator Module from the deployment loop to avoid an accidental deployment. Diagnostic procedures do not normally require fuse removal or disconnection of the Inflator Module. Always refer to GM service procedures for diagnosis.

CAUTION: When performing service on or around SIR components or SIR wiring, follow the procedures listed below to temporarily disable the SIR system. Refer to appropriate service manual procedures. Failure to follow procedures could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

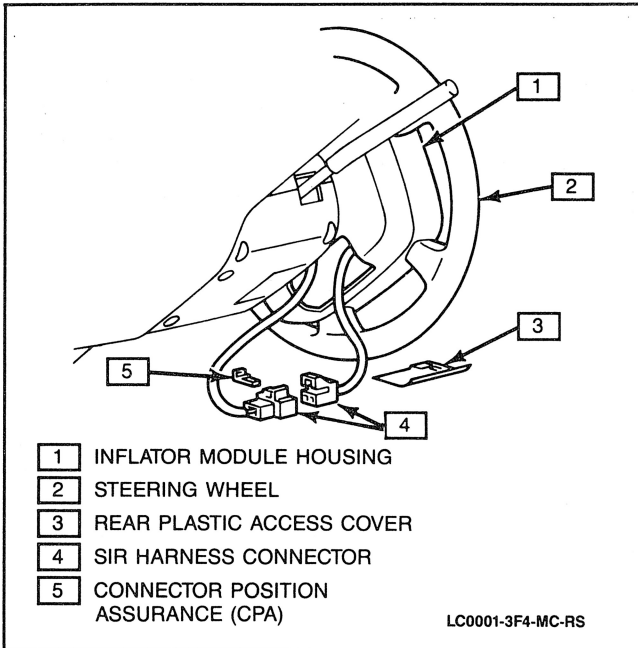


Figure 1 SIR Harness Connector

Disabling the SIR System

Figure 1

Remove or Disconnect

- Turn ignition switch to "OFF."
- 1. SIR IG Fuse from the SIR fuse block.
- 2. Rear plastic access cover from inflator module housing.
- 3. Connector position assurance (CPA) and yellow two-way connector inside the inflator module housing.

Enabling the SIR System

Figure 1

Install or Connect

- Turn ignition switch to "OFF."
- 1. Yellow two-way connector and connector position assurance (CPA) inside the inflator module housing.
- 2. SIR IG Fuse to the SIR fuse block.
- 3. Rear plastic access cover to inflator module housing.
- Turn ignition switch to "RUN." Observe "INFLATABLE RESTRAINT" indicator lamp. If lamp does not flash 7 to 9 times and then

remain off, refer to SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM DIAGNOSIS (SEC.9J-A).

FRONT END SEALING

Figures 2, 3 and 4

All potential water leak locations are sealed in production with high quality durable sealers. Should it be necessary to reseal specific areas, use a high quality sealer of medium-bodied consistency which will retain its flexible characteristics after curing and can be painted, if necessary.

COWL VENT GRILLES

Figure 5

Remove or Disconnect

1. Retaining nuts securing right and left windshield wiper assemblies to the linkage.
2. Right and left windshield wiper assemblies from linkage.
3. Plastic retaining pins securing the cowl vent grilles to the vehicle.
4. Right and left cowl vent grilles.

Install or Connect

1. Right and left cowl vent grilles.
2. Plastic retaining pins securing the right and left cowl vent grilles.
3. Right and left windshield wiper assemblies onto the linkage.
4. Retaining nuts securing right and left windshield wiper assemblies to the linkage.

Tighten

- Wiper assembly retaining nuts to 20 N·m (15 lb.ft.)

DOOR JAMB SWITCH

Figure 6

Remove or Disconnect

1. Battery negative (-) cable.
2. Rubber boot from switch.
3. Switch from vehicle.
4. Switch electrical connector.

Install or Connect

1. Switch electrical connector.
2. Switch onto vehicle.
3. Rubber boot onto switch.
4. Battery negative (-) cable.

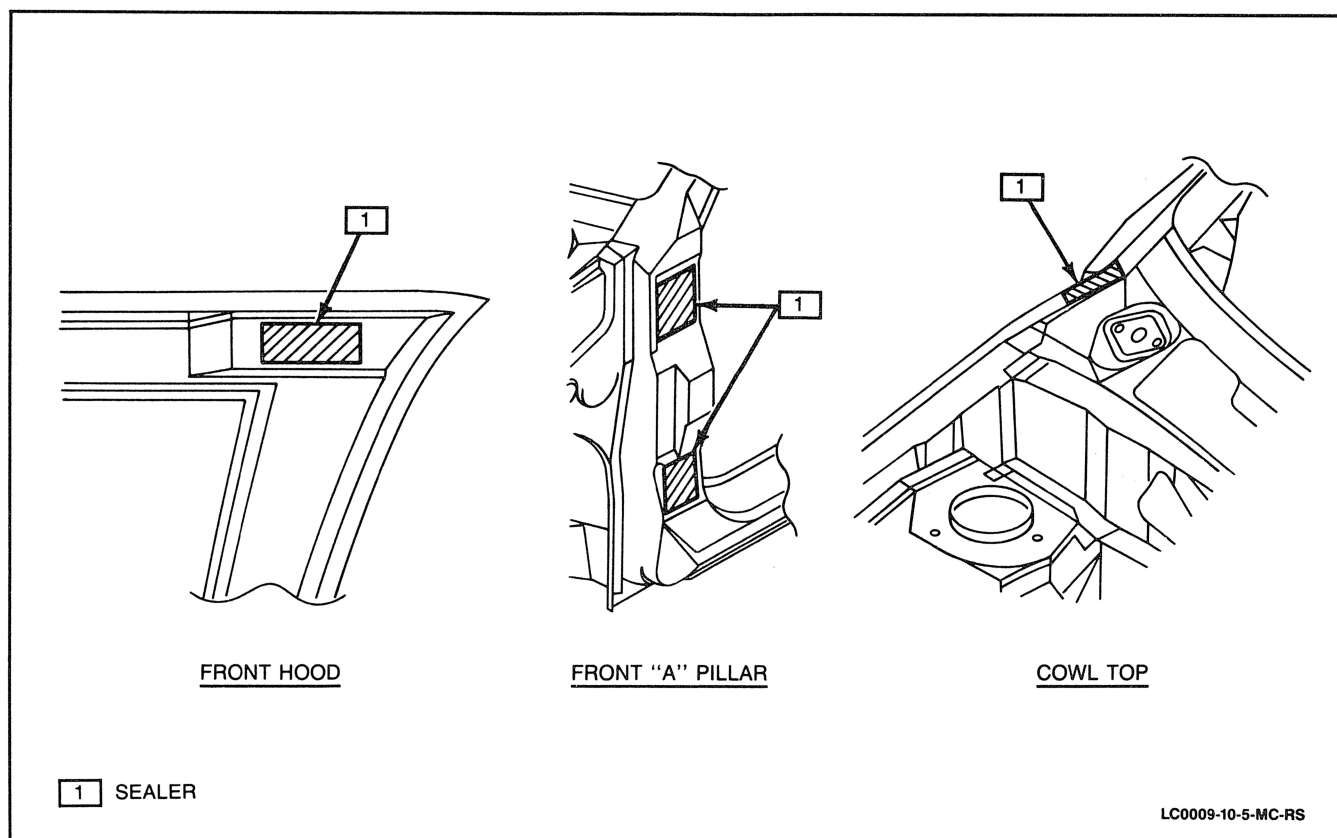


Figure 2 Body Sealing (1 of 3)

HOOD

Figures 7 and 8



Remove or Disconnect

- Raise and support the hood.
 - Install protective covers over fender to prevent paint damage.
 - Mark the position of the hinges to the hood for easy assembly.
1. Hood retaining bolts.
 2. Hood from the vehicle.



Install or Connect

1. Hood onto the hinge.
 2. Bolts finger tight securing the hood to the hinges.
- Align the hood with the position marks.



Tighten

- Hood hinge-to-hood bolts to 27 N·m (20 lb.ft.).



Inspect

- Hood for proper alignment, adjust if necessary.

HOOD HINGE



Remove or Disconnect

- Raise and support the hood.
 - Install protective covers over the fenders to prevent paint damage.
 - Mark the position of the hood hinge on the hood.
1. Four bolts and hood from vehicle.
 2. Right and left cowl vent grilles. Refer to "Cowl Vent Grilles" earlier in this section.
 3. Hinge retaining bolts.
 4. Hinge from vehicle.



Install or Connect

1. Hinge to vehicle.
2. Hood hinge-to-vehicle bolts.



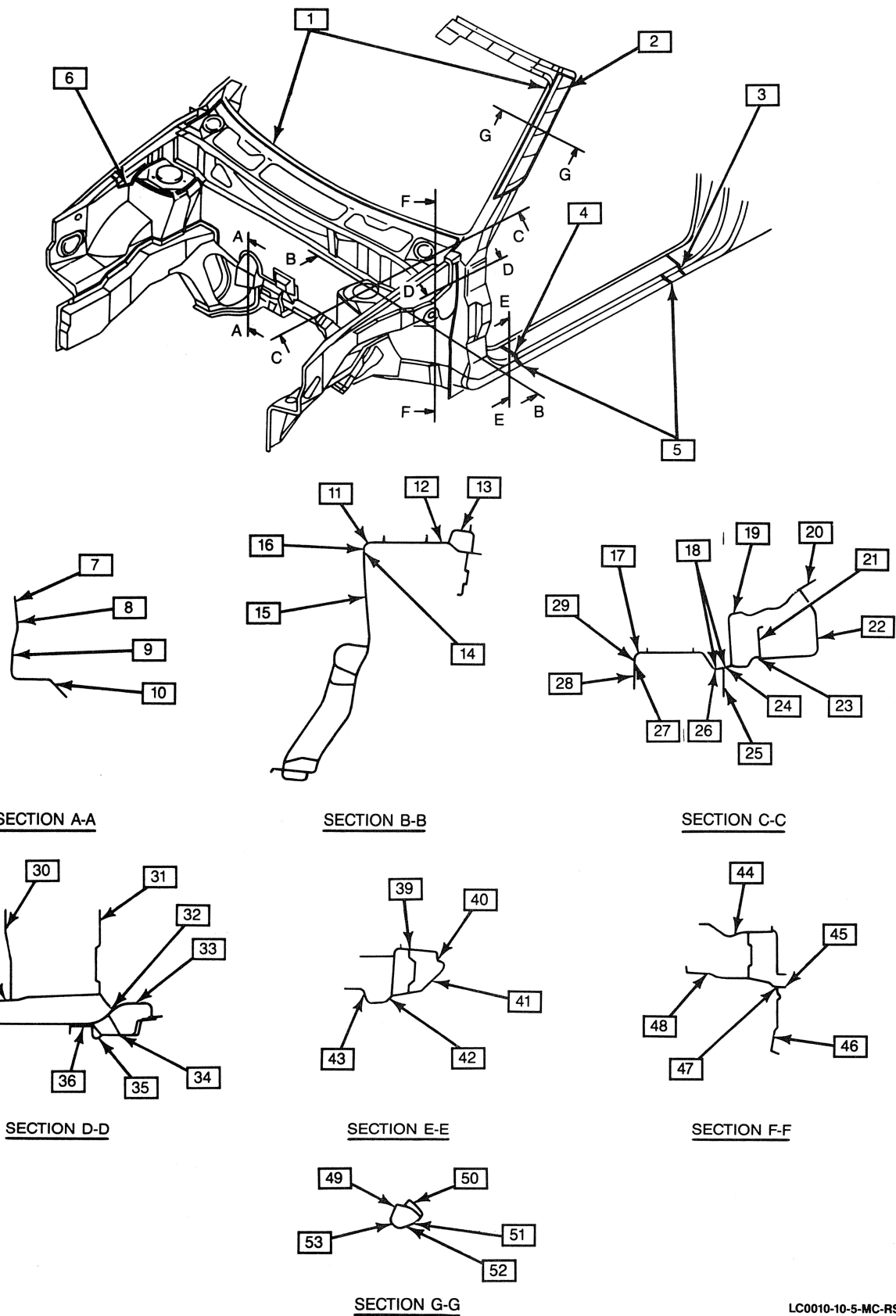
Tighten

- Hood hinge-to-vehicle bolts to 27 N·m (20 lb.ft.).
3. Right and left cowl vent grilles. Refer to "Cowl Vent Grilles" earlier in this section.
 4. Hood to hinge; secure with 4 bolts.



Tighten

- Hood hinge-to-hood bolts to 27 N·m (20 lb.ft.).



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Figure 3 Body Sealing (2 of 3)

- | | | |
|-----------------------------|--|-----------------------------|
| 1 BODY SEALER | 19 COWL TOP PANEL | 36 BODY SEALER |
| 2 REMOVE ANY SURPLUS SEALER | 20 BODY SEALER | 37 COWL SIDE INNER MEMBER |
| 3 BODY SEALER | 21 COWL VENTILATOR SEALING | 38 BODY SEALER |
| 4 SEALER | 22 COWL UPPER PANEL | 39 FRONT PILLAR OUTER PANEL |
| 5 REMOVE ANY SURPLUS SEALER | 23 SPOT SEALER | 40 BODY SEALER |
| 6 BODY SEALER | 24 BODY SEALER | 41 SIDE SILL OUTER PANEL |
| 7 DASH PANEL | 25 DASH PANEL | 42 BODY SEALER |
| 8 SPOT SEALER | 26 SPOT SEALER BETWEEN DASH AND COWL UPPER | 43 MAIN FLOOR PANEL |
| 9 DASH PANEL EXTENSION | 27 BODY SEALER | 44 COWL TOP PANEL |
| 10 SPOT SEALER | 28 FRONT FENDER APRON PANEL | 45 SPOT SEALER |
| 11 SUSPENSION UPPER BRACKET | 29 BODY SEALER | 46 DASH SIDE PANEL |
| 12 BODY SEALER | 30 COWL TOP PANEL | 47 BODY SEALER |
| 13 COWL, SIDE INNER MEMBER | 31 COWL UPPER PANEL | 48 COWL UPPER PANEL |
| 14 BODY SEALER | 32 BODY SEALER | 49 BODY SEALER |
| 15 FRONT PANEL FENDER APRON | 33 DASH SIDE PANEL | 50 FRONT PILLAR OUTER COVER |
| 16 BODY SEALER | 34 SPOT SEALER | 51 BODY SEALER |
| 17 SUSPENSION UPPER BRACKET | 35 SIDE BODY OUTER PANEL | 52 FRONT PILLAR OUTER PANEL |
| 18 BODY SEALER | | 53 FRONT PILLAR INNER PANEL |

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Figure 4 Body Sealing (3 of 3)

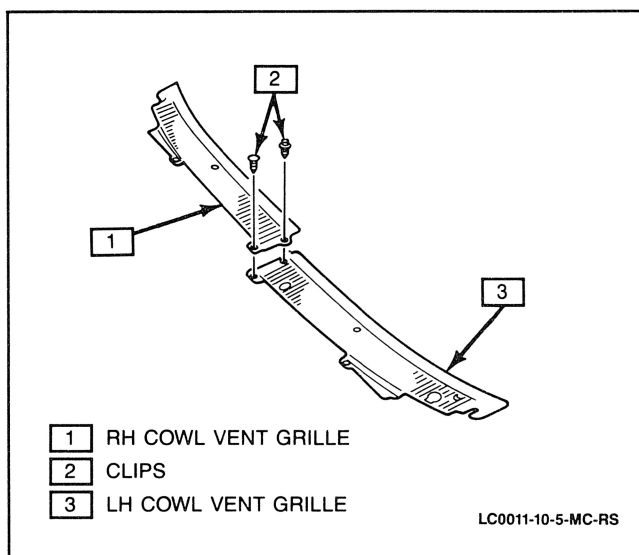


Figure 5 Cowl Vent Grilles



Inspect

- Hood for proper alignment, adjust if necessary.

HOOD PROP ROD



Remove or Disconnect

- Raise and support the hood.
- Hood prop rod from pivot clip.
 - Remove pivot clip from fender.

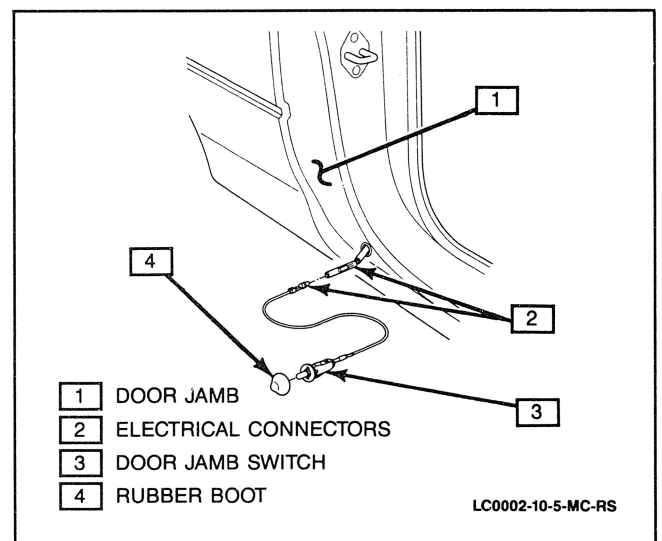


Figure 6 Door Jamb Switch



Install or Connect

- Hood pivot clip into fender.
- Hood prop rod into pivot clip.

HOOD LATCH

Figure 9



Remove or Disconnect

- Raise and support the hood.
- Hood latch cable from the hood latch.

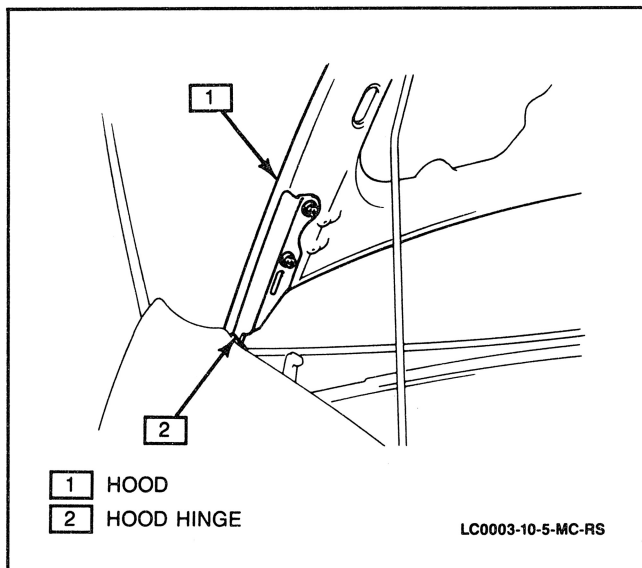


Figure 7 Hood Hinge

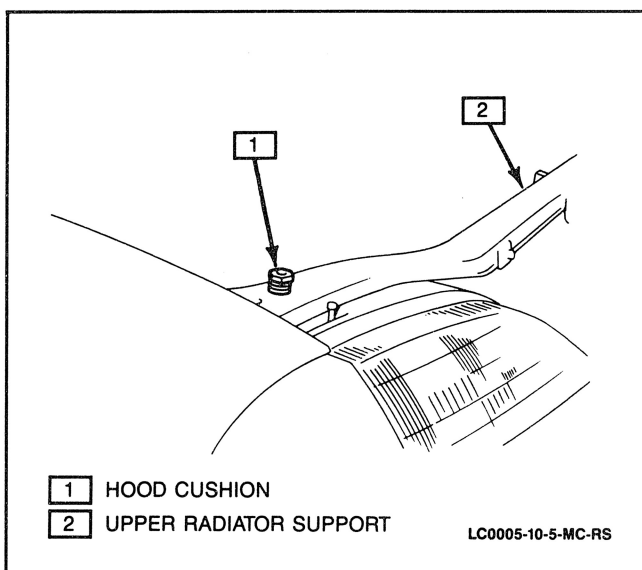


Figure 8 Vertical Hood Adjustment

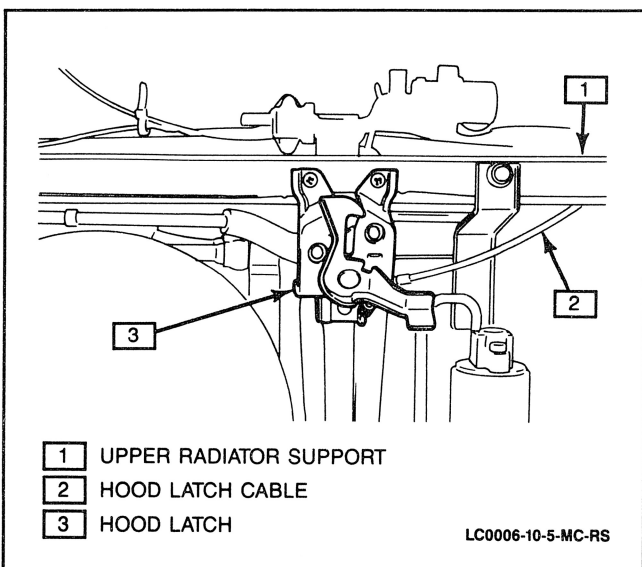


Figure 9 Hood Latch

- Mark the position of the bolts on the hood latch.
- 2. Bolts securing the hood latch to the vehicle.
- 3. Hood latch from the vehicle.

Install or Connect

1. Hood latch cable to hood latch.
2. Hood latch to the vehicle.
3. Bolts securing hood latch to vehicle.

Tighten

- Hood latch bolts to 27 N·m (20 lb.ft.).

Inspect

- For proper alignment and operation. Adjust if necessary.

HOOD LATCH RELEASE CABLE

Remove or Disconnect

- Raise and support the hood.
- 1. Three bolts and hood latch.
- 2. Cable at latch.
- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
- 3. Left front tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
- 4. Screws, clips, and left front wheel housing.
- 5. Screw and hood release handle at lower left side of instrument panel.
- 6. Cable from release handle.
- 7. Cable from vehicle.

Install or Connect

- Position cable into vehicle.
- 1. Cable to release handle.
- 2. Release handle to instrument panel, secure with screw.
- 3. Left front wheel housing, clips, and screws.
- 4. Left front tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
- Lower vehicle.
- 5. Cable to latch.
- 6. Hood latch securing with 3 bolts.

Tighten

- Hood latch bolts to 27 N·m (20 lb.ft.).

Inspect

- Hood latch for proper operation and alignment, adjust if necessary.

FRONT FENDER

Figures 10 and 11

↔ Remove or Disconnect

- Raise and support the hood.
- 1. Screws securing the parking lamp assembly to the fender.
- 2. Lamp from lens.
- Raise and suitably support vehicle. Refer to GENERAL INFORMATION (SEC.0A).
- 3. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
- 4. Screws, clips, and front wheel housing.
- 5. Fender bolts at the door pillar.
- 6. Upper fender bolts.
- 7. Front lower fender bolts.
- 8. Inner fender bolt.
- 9. Fender from vehicle.

NOTICE: When replacing the front fender, be sure to apply anticorrosive treatment to the replacement fender. Refer to GENERAL BODY SERVICE PROCEDURES (SEC.10-1) of the 1990 Geo Metro Service Manual.

→← Install or Connect

1. Fender to vehicle.
2. Upper fender bolts.
3. Front lower fender bolt.
4. Inner fender bolt.
5. Fender bolts at door pillar.

Tighten

- All fender bolts to 27 N·m (20 lb.ft.).
- 6. Front fender wheel housing, clips, and screws.
- 7. Tire and wheel assembly. Refer to TIRES AND WHEELS (SEC.3E).
- Lower vehicle.

Adjust

- Loosen bolts to align fender.
- 8. Parking lamp to lens.
- 9. Lens to vehicle and secure with screws.
- Carefully lower the hood and verify proper alignment of fender to hood, adjust if necessary.

RADIATOR SUPPORT

↔ Remove or Disconnect

- Disable the SIR System. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.
- 1. Battery negative (-) cable.
- 2. Headlamps. Refer to LIGHTING SYSTEMS AND HORN (SEC.8B).

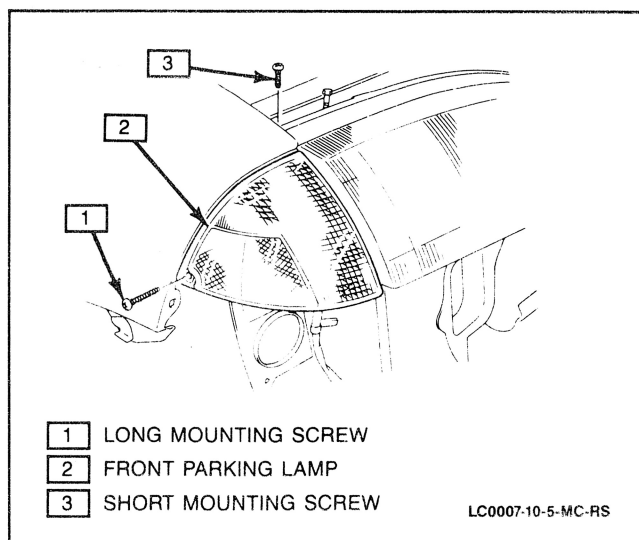
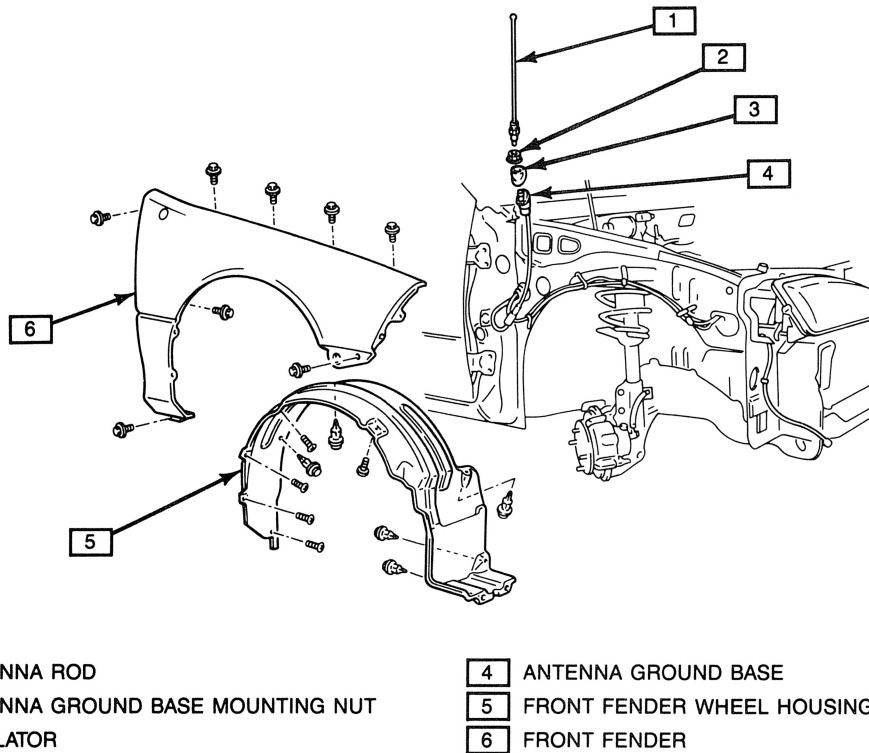


Figure 10 Parking Lamp Assembly

3. Condenser (if equipped). Refer to AIR CONDITIONER (SEC.1B) of the 1990 Geo Metro Service Manual.
4. Radiator. Refer to ENGINE COOLING (SEC. 6B) of the 1990 Geo Metro Service Manual.
5. Three bolts and hood latch.
6. One bolt, electrical connector and horn.
7. Forward discriminating sensor. Refer to "Forward Discriminating Sensor" later in this section.
8. Clips and fasteners securing hood release cable and electrical wiring.
9. Outer front fender bolts.
10. Bolt securing vertical center radiator support to upper radiator support.
11. Radiator support from vehicle.

→← Install or Connect

1. Radiator support to vehicle.
2. Bolt securing vertical center radiator support to upper radiator support.
3. Outer front fender bolts.
4. Clips and fasteners securing hood release cable and electrical wiring.
5. Forward discriminating sensor. Refer to "Forward Discriminating Sensor" later in this section.
6. Horn, 1 bolt and electrical connector.
7. Hood latch and 3 bolts.
8. Radiator. Refer to ENGINE COOLING (SEC. 6B) of the 1990 Geo Metro Service Manual.
9. Condenser (if equipped). Refer to AIR CONDITIONER (SEC.1B) of the 1990 Geo Metro Service Manual.
10. Headlamps. Refer to LIGHTING SYSTEMS AND HORNS (SEC.8B).
11. Enable the SIR system. Refer to "Enabling the SIR System" located under "Service Precautions" earlier in this section.



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Figure 11 Front Fender Assembly

WHEEL HOUSING

↔ Remove or Disconnect

1. Screws and clips securing the wheel housing.
2. Wheel housing from fender.

→→ Install or Connect

1. Wheel housing to fender.
2. Screws and clips securing wheel housing.

ANTENNA

Figure 11

↔ Remove or Disconnect

1. Screws, clips, and fender wheel housing.
2. Antenna rod from ground base.
3. Antenna ground base mounting nut and insulator.
4. Antenna connector located behind wheel housing.
5. Antenna ground base assembly.

→→ Install or Connect

1. Antenna ground base assembly to fender.
2. Insulator and ground base nut.
3. Antenna connector.
4. Wheel housing, screws, and clips.
5. Antenna rod into ground base.

LICENSE PLATE BRACKET

↔ Remove or Disconnect

1. Screws securing bracket to bumper fascia.
2. Bracket from bumper fascia.

→→ Install or Connect

- Position bracket to bumper fascia.
1. Screws securing bracket.

FORWARD DISCRIMINATING SENSOR

Figures 12 and 13

↔ Remove or Disconnect

- Disable the SIR system. Refer to "Disabling the SIR System" located under "Service Precautions" earlier in this section.
1. Battery negative (-) cable.
 2. Forward discriminating sensor connector from lamp support panel.
 3. Connector position assurance (CPA) and sensor connector.
 4. Two sensor lead wire clamps.
 5. Two bolts securing sensor to vehicle.
 6. Sensor from vehicle.

→→ Install or Connect

1. Sensor to vehicle; secure with 2 bolts.

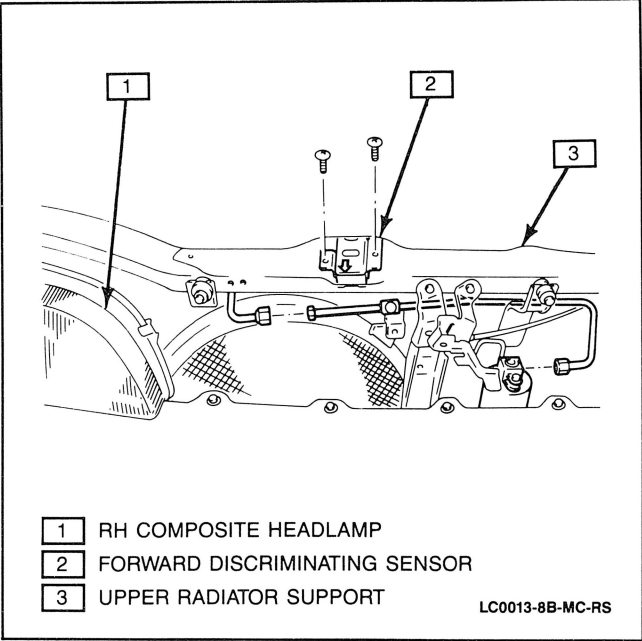


Figure 12 Forward Discriminating Sensor



Tighten

- Forward discriminating sensor mounting bolts to 11 N·m (98 lb.in.).
- 2. Two sensor lead wire clamps.
- 3. Connector position assurance (CPA) and sensor connector.

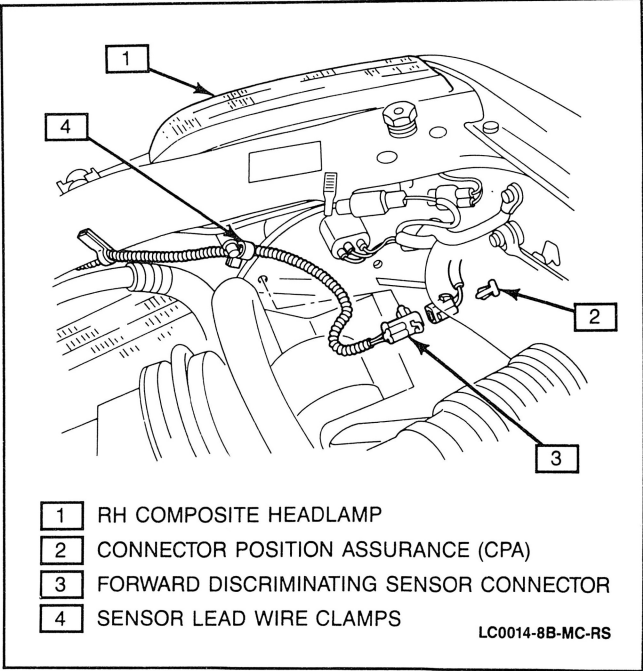


Figure 13 Forward Discriminating Sensor Connector

- 4. Forward discriminating sensor connector to lamp support panel.
- 5. Battery negative (-) cable.
 - Enable the SIR system. Refer to “Enabling the SIR System” located under “Service Precautions” earlier in this section.

SPECIFICATIONS

FASTENER TORQUES

Wiper Assembly Retaining Nuts	20 N·m (15 lb.ft.)
Hood Hinge-to-Hood Bolts	27 N·m (20 lb.ft.)
Hood Hinge-to-Vehicle Bolts	27 N·m (20 lb.ft.)
Hood Latch Bolts	27 N·m (20 lb.ft.)
Fender Bolts	27 N·m (20 lb.ft.)
Forward Discriminating Sensor Mounting Bolts	11 N·m (98 lb.in.)

SECTION 10-6

DOORS

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around **SIR** components or **SIR** wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded **SIR** system repairs.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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FRONT DOOR TRIM

Interior

Figures 1 through 4

Remove or Disconnect

1. One screw retaining inside door handle. Do not remove door handle.
2. Three plastic screw covers from door armrest.
3. Three screws and armrest from door.
4. Window regulator handle. Use a cloth to pull off snap ring (Figure 2).
 - Gently pry door trim away from door, disengaging retaining clips.
 - Rotate door trim and remove from door (Figure 3).
5. Two screws and map pocket from door trim (if necessary).
6. Air outlet grille from door trim (if necessary).

Install or Connect

1. Air outlet grille and map pocket to door trim (if necessary).
2. Door trim to door; position inside door handle through door trim.
 - Rotate door trim to proper position and press into place, engaging retaining clips.
3. Window regulator handle to door; secure with snap ring. Make sure that the window regulator

handle is at a 45 degree angle when glass is fully closed (Figure 4).

4. Armrest to door; secure with 3 screws.
5. Three plastic screw covers to armrest.
6. One screw securing inside door handle to door.

Exterior

All exterior trim and moldings are adhesive retained. Refer to **GENERAL BODY SERVICE INFORMATION (SEC.10-1)** of the 1990 Geo Metro Service Manual for removal and installation procedures for all exterior door trim.

FRONT DOOR HARDWARE AND GLASS

WEATHERSTRIP

Remove or Disconnect

1. Five plastic retaining pins from weatherstrip.
2. Door hinge pin.
 - Pull weatherstrip from door.

Install or Connect

1. Weatherstrip to door; secure with 5 plastic retaining pins.
2. Door hinge pin.

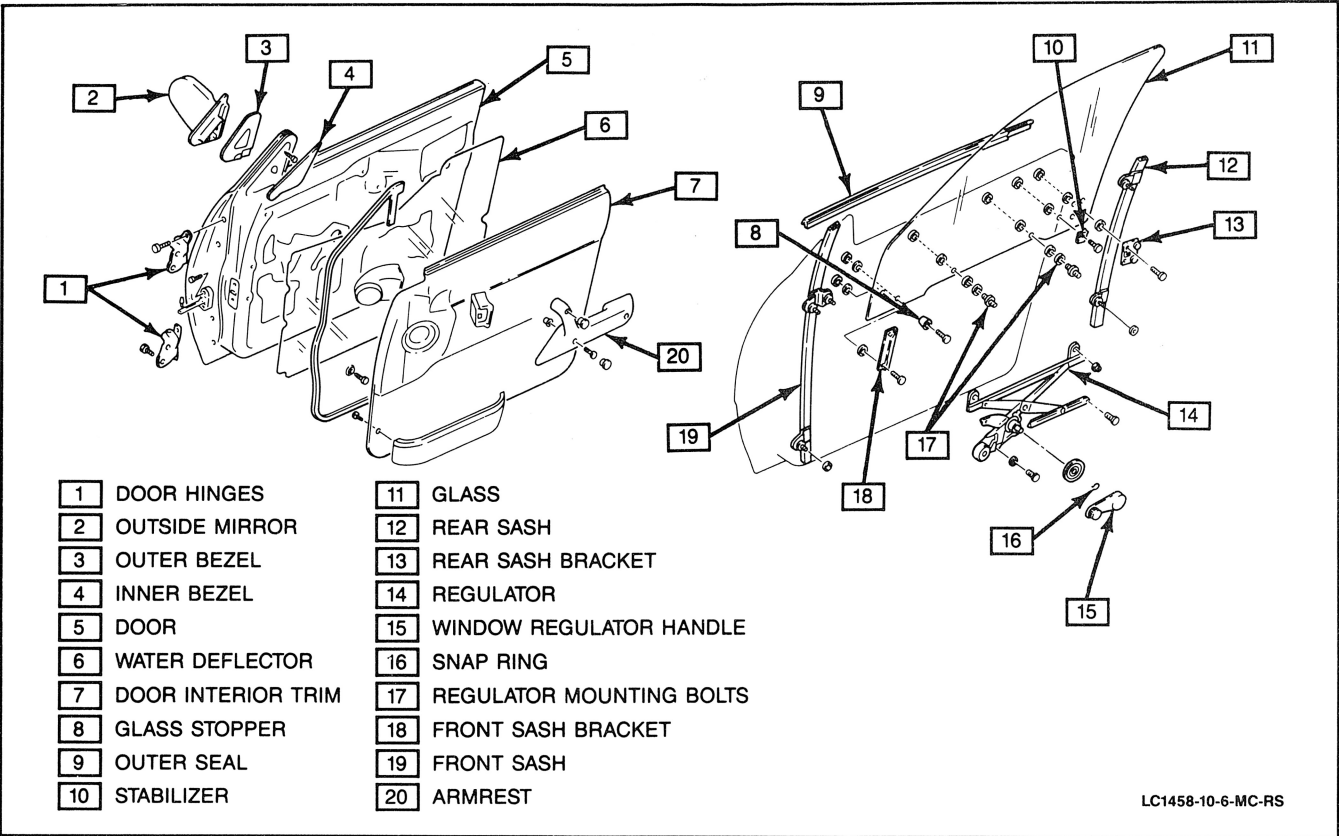


Figure 1 Front Door Assembly

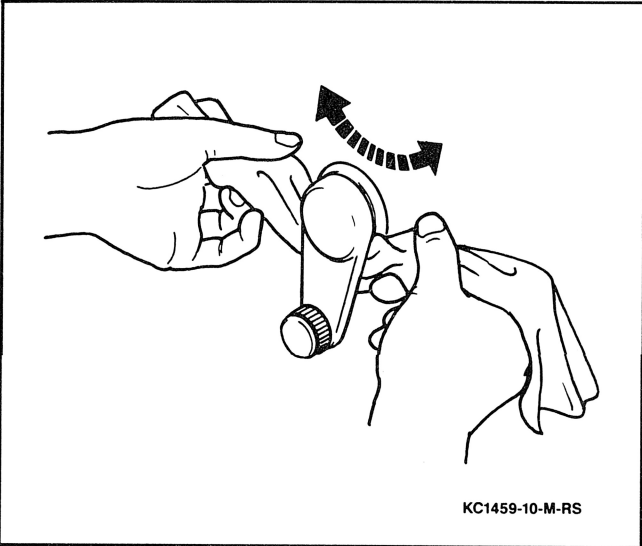


Figure 2 Removing Window Regulator Handle

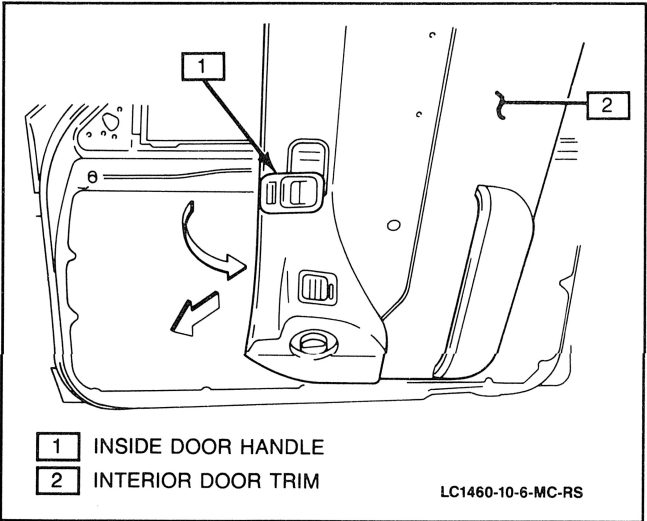


Figure 3 Removing Door Trim

SEALING STRIPS

Inside and Outside

 Remove or Disconnect

1. Front door interior trim. Refer to “Front Door Trim” earlier in this section.

2. Inside sealing strip.
3. Outside sealing strip.

 Install or Connect

1. Outside sealing strip.
2. Inside sealing strip.
3. Front door interior trim. Refer to “Front Door Trim” earlier in this section.

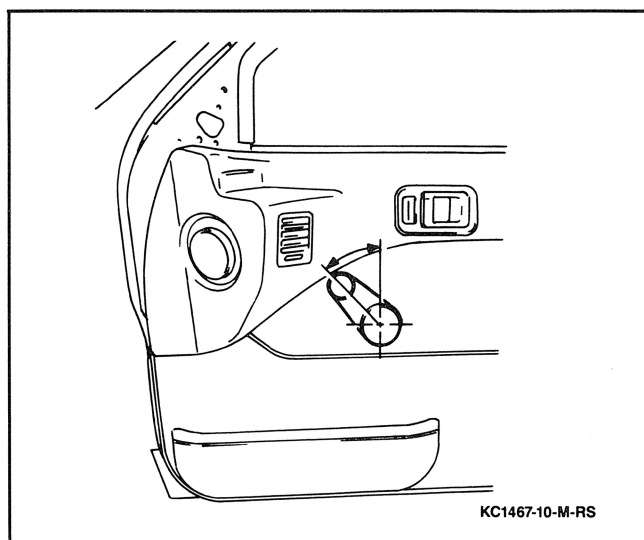


Figure 4 Installing Window Regulator Handle

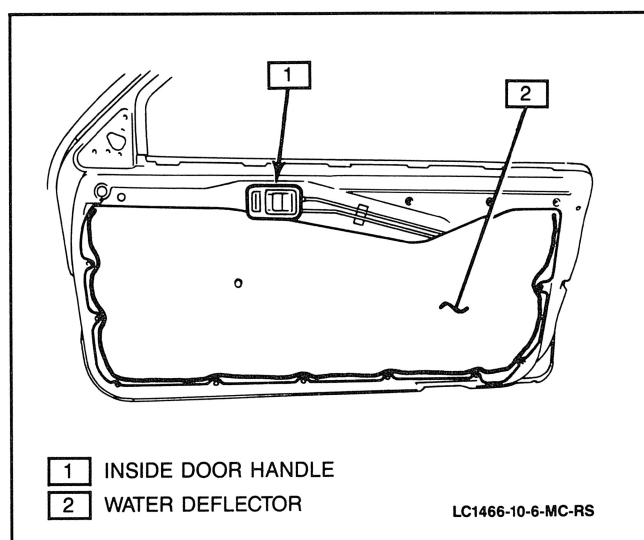


Figure 5 Water Deflector

WATER DEFLECTOR

Figure 5

Remove or Disconnect

1. Front door interior trim. Refer to "Front Door Trim" earlier in this section.
2. Water deflector from door.

Install or Connect

- Apply adhesive to the back of the water deflector.
1. Water deflector to door.
 2. Front door interior trim. Refer to "Front Door Trim" earlier in this section.

MIRRORS

Figure 1

Remove or Disconnect

- Gently pry inner mirror bezel off.

1. Three screws and mirror assembly from door.
2. Outer mirror bezel from mirror.
3. Gasket from mirror.

Install or Connect

1. Gasket to mirror.
2. Outer bezel to mirror.
3. Mirror assembly to door; secure with 3 screws.
4. Inner mirror bezel.

HANDLES

Interior

Figure 6

Remove or Disconnect

1. Front door interior trim. Refer to "Front Door Trim" earlier in this section.
2. Latch and lock rods from inside door handle.
3. Inside door handle from door.

Install or Connect

1. Inside door handle to door.
2. Latch and lock rods to inside door handle.
3. Front door interior trim. Refer to "Front Door Trim" earlier in this section.

Exterior

Figures 6, 7 and 8

Remove or Disconnect

1. Front door interior trim. Refer to "Front Door Trim" earlier in this section.
2. Door glass. Refer to "Glass" later in this section.
3. Latch and lock rods from outside door handle.
4. Two bolts and outside door handle from door.

Install or Connect

1. Outside door handle to door; secure with 2 bolts.

Tighten

- Outside door handle retaining bolts to 7 N·m (62 lb.in.).
2. Latch and lock rods to outside door handle.
 3. Door glass. Refer to "Glass" later in this section.
 4. Front door interior trim. Refer to "Front Door Trim" earlier in this section.

DOOR LOCKS AND STRIKERS

Figures 6 and 9 through 11

Remove or Disconnect

1. Front door interior trim. Refer to "Front Door Trim" earlier in this section.

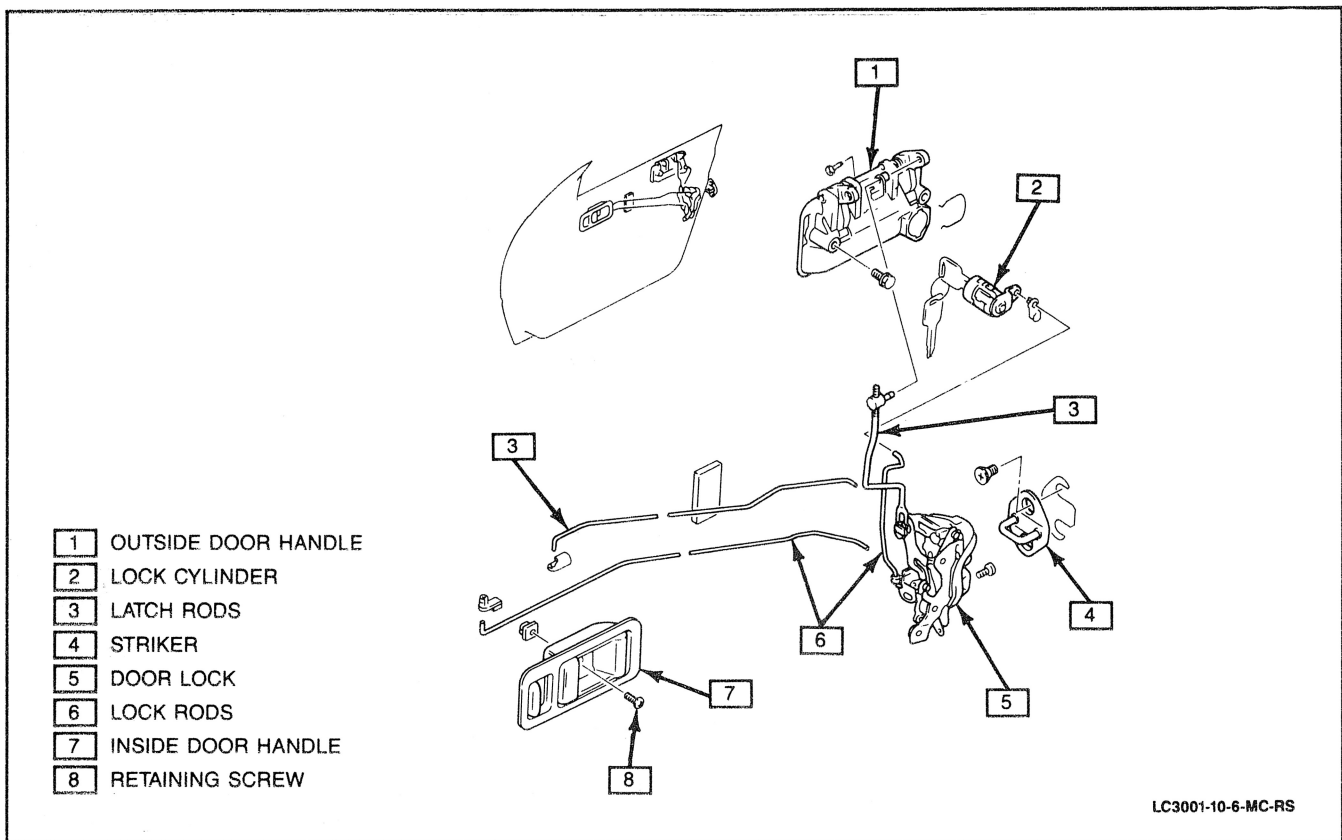


Figure 6 Front Door Lock Assembly

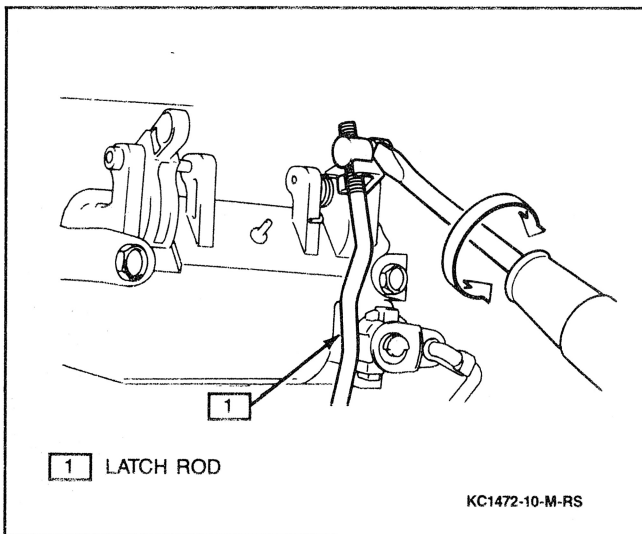


Figure 7 Removing Latch Rod



Adjust

- Latch rod distance "A" to 0 to 2 mm (0 to 0.08-inch).
- Striker up and down measurement so that the striker shaft aligns with the center of the door lock.

4. Front door interior trim. Refer to "Front Door Trim" earlier in this section.

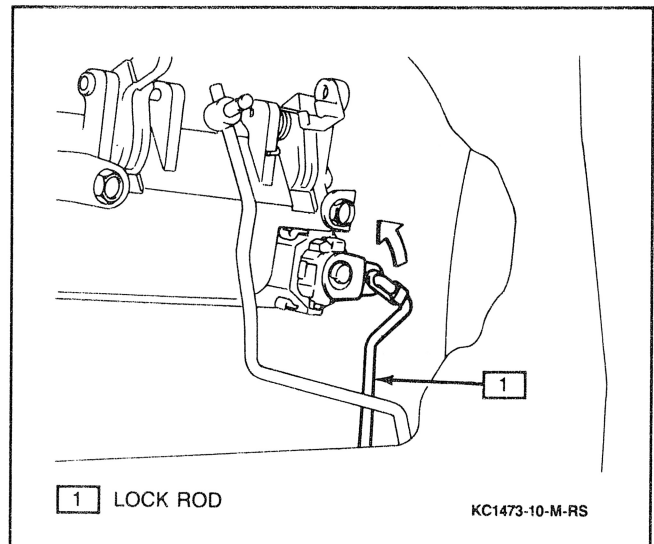


Figure 8 Removing Lock Rod

2. Latch and lock rods from door latch.
3. Three screws and door lock assembly from door.
4. Two screws and striker from door jamb.



Install or Connect

1. Striker to door jamb, secure with 2 screws.
2. Door lock assembly to door; secure with 3 screws.
3. Latch and lock rods to door latch.

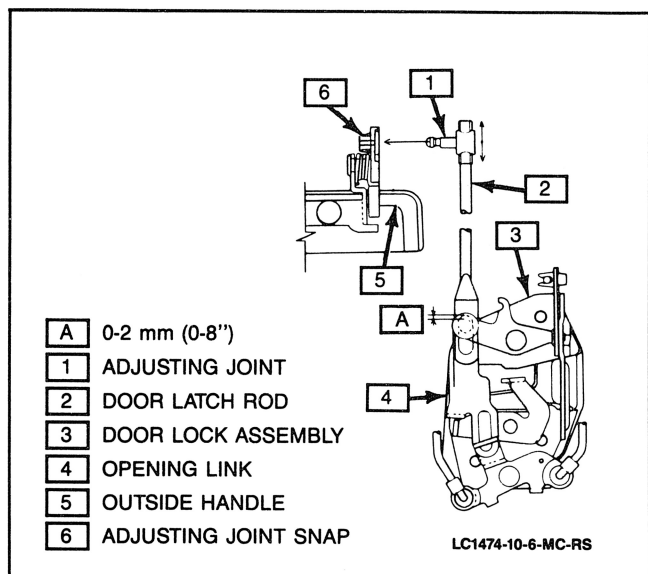


Figure 9 Door Lock and Rods

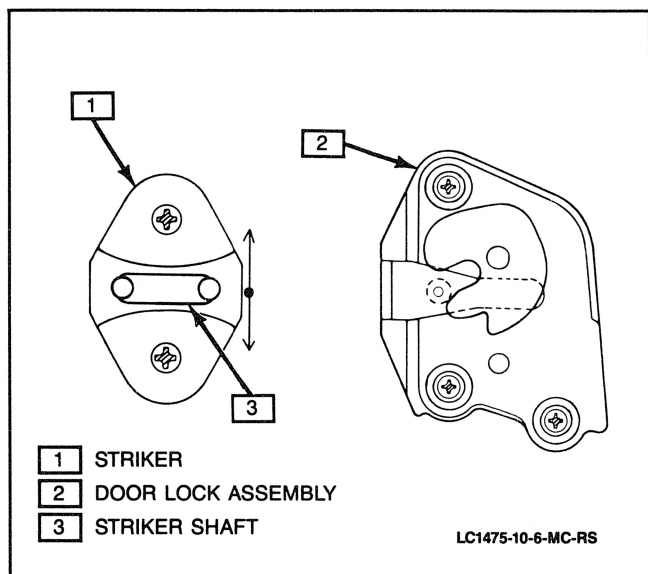


Figure 10 Aligning Striker

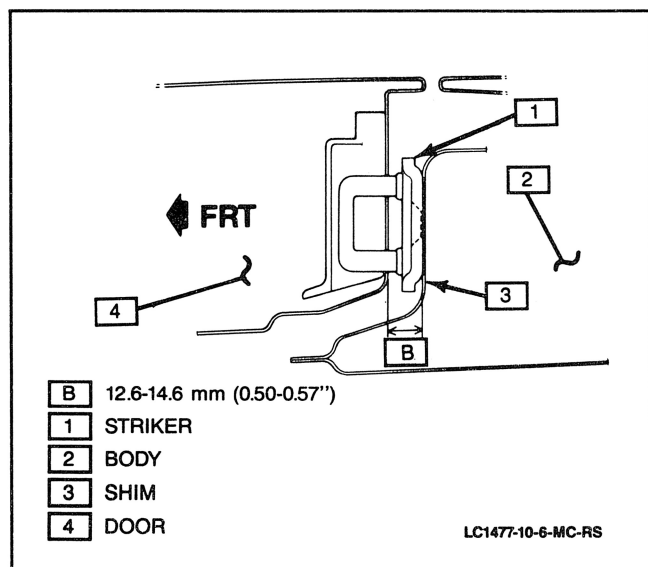


Figure 11 Adjusting Striker

**Adjust**

- Striker-to-door distance "B" to 12.6 to 14.6 mm (0.50 to 0.57-inch) by installing or removing shims.

LOCK CYLINDER**Figure 6****Remove or Disconnect**

- Front door interior trim. Refer to "Front Door Trim" earlier in this section.
- Lock rod from lock cylinder.
- Retaining clip and lock cylinder from door.

**Install or Connect**

- Lock cylinder to door; secure with retaining clip.
- Lock rod to lock cylinder.
- Front door interior trim. Refer to "Front Door Trim" earlier in this section.

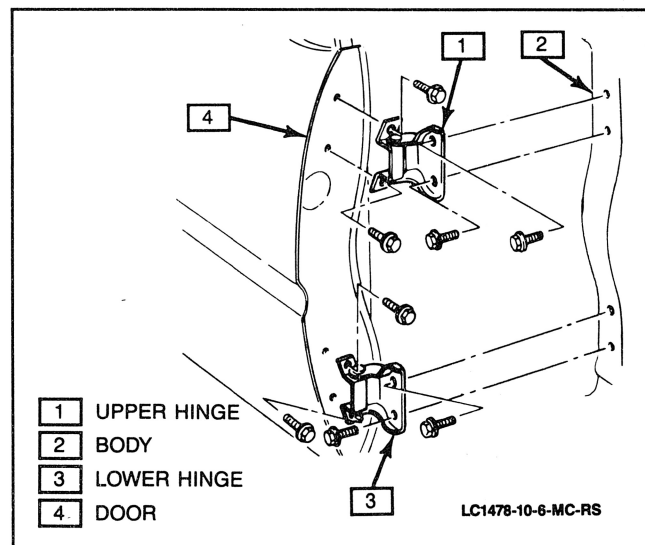


Figure 12 Door Hinges

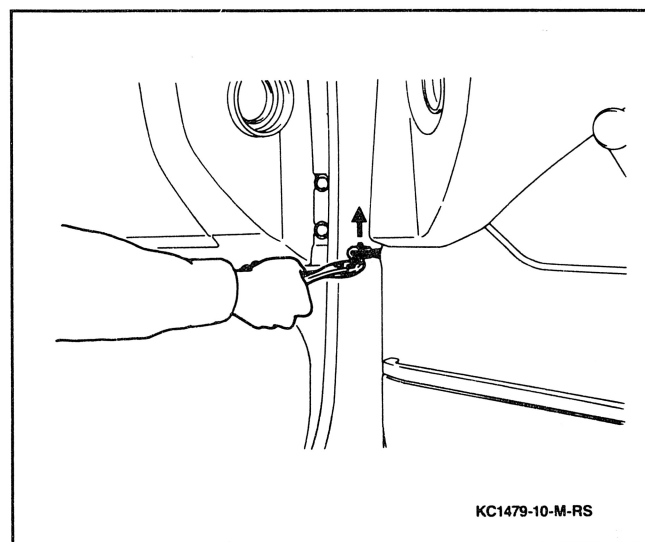


Figure 13 Removing Door Hinge Pin

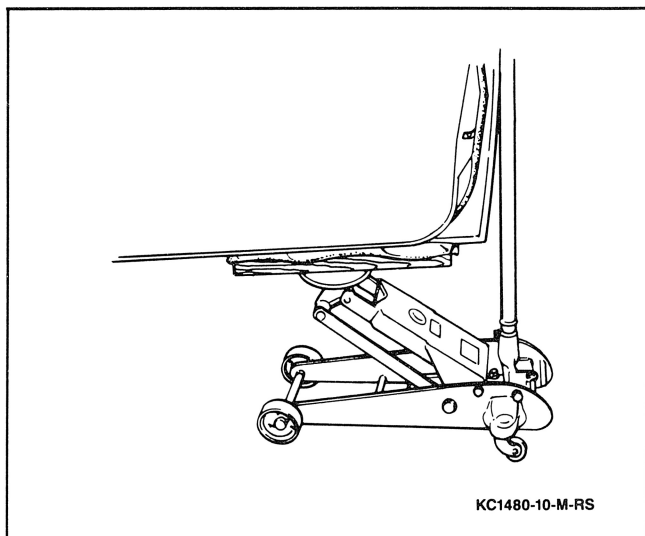


Figure 14 Door Support with Jack

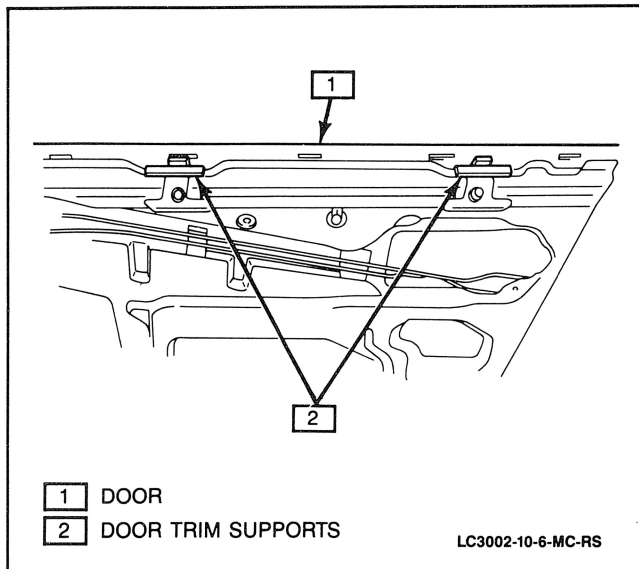


Figure 15 Door Trim Supports

HINGES

Figures 12, 13 and 14

Remove or Disconnect

- Use a jack to support door and place a piece of wood between jack and door.

1. Door hinge pin.
2. Four bolts and door from hinges.
3. Four bolts and upper and lower hinges from door jamb.

Install or Connect

1. Upper and lower hinges to door jamb; secure each hinge with 2 bolts.

Tighten

- Door hinge-to-door jamb bolts to 34 N·m (25 lb.ft.).
2. Door to hinges, securing with 4 bolts.

Tighten

- Door-to-door hinge bolts to 34 N·m (25 lb.ft.).
3. Door hinge pin.

Adjust

- Door striker. Refer to “Door Locks and Strikers” earlier in this section.

GLASS

Figures 1 and 15 through 22

Remove or Disconnect

1. Front door interior trim. Refer to “Front Door Trim” earlier in this section.
- Gently pry off inner mirror bezel.
2. Water deflector from door.

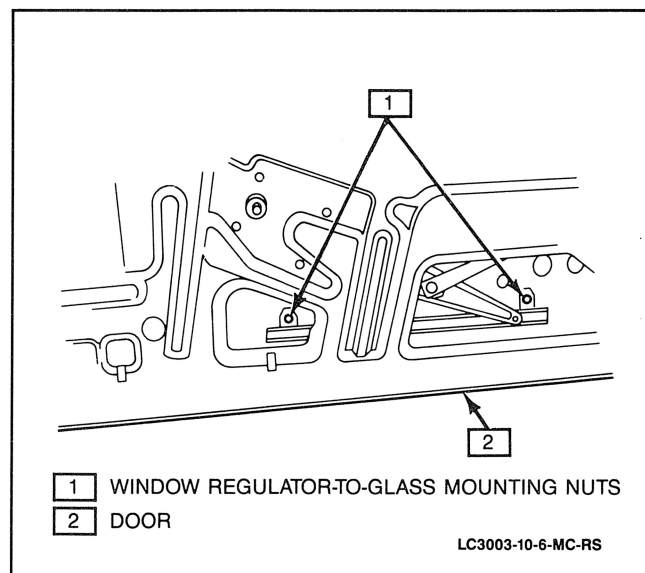


Figure 16 Window Regulator-to-Glass Mounting Nuts

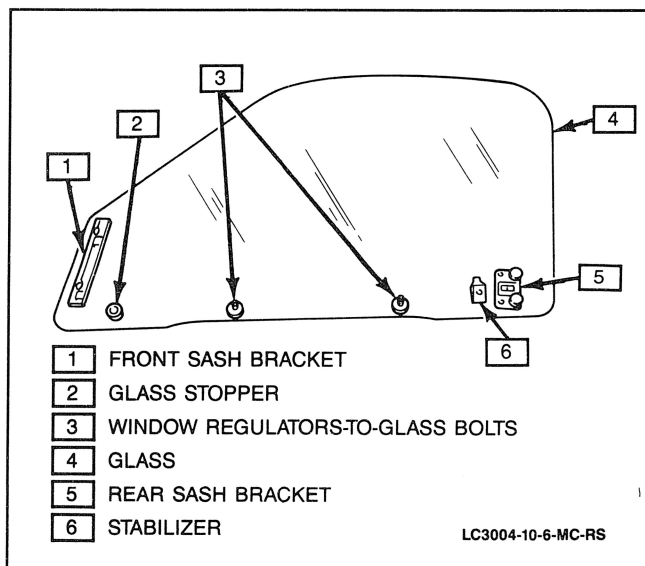


Figure 17 Glass Hardware

- Reposition inside door handle temporarily.
- 3. Outer seal from door.
- 4. Two screws and both door trim supports (Figure 15).
- 5. Two window regulator-to-glass mounting nuts.
- 6. Glass assembly from door.
- 7. Window regulator-to-glass bolts, glass stopper, stabilizer and front and rear sash brackets from glass.
- 8. Front and rear sashes from door.

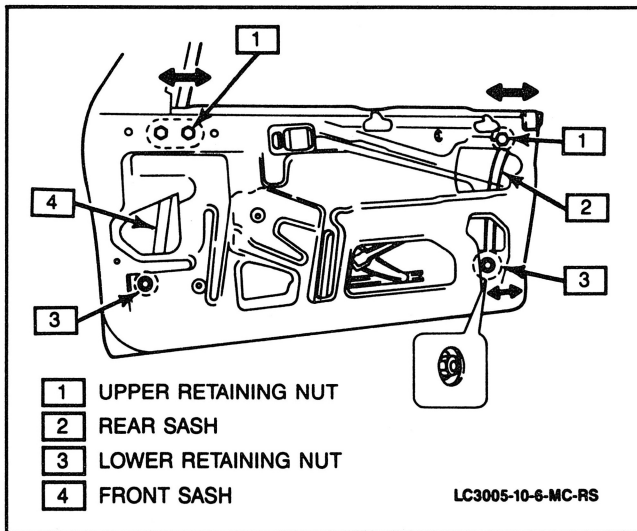


Figure 18 Adjusting Glass in Front/Rear Direction

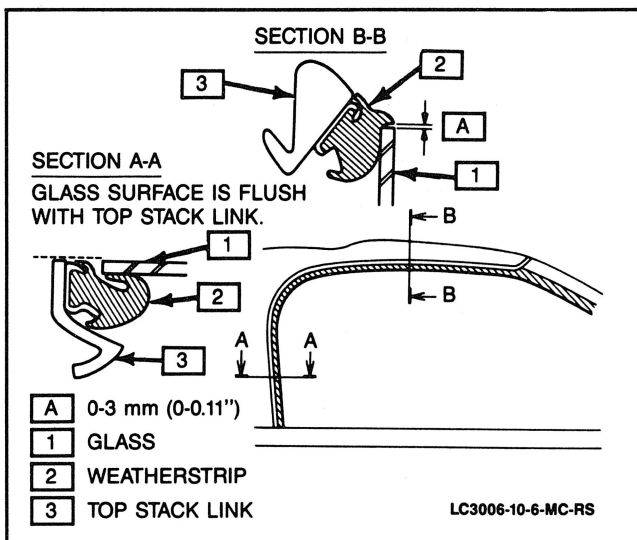


Figure 19 Adjusting Glass Position

Install or Connect

1. Front and rear sashes to door. Do not tighten nuts fully.
2. Window regulator-to-glass bolts, glass stopper, stabilizer and front and rear sash brackets to glass.



Tighten

- All glass mounting screws and bolts to 5 N·m (44 lb.in.). Overtightened screws and bolts may break glass.

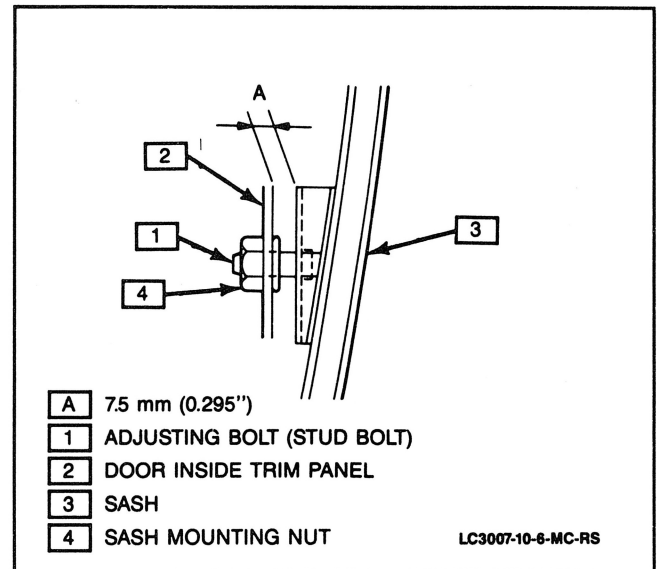


Figure 20 Adjusting Glass in Left/Right Direction

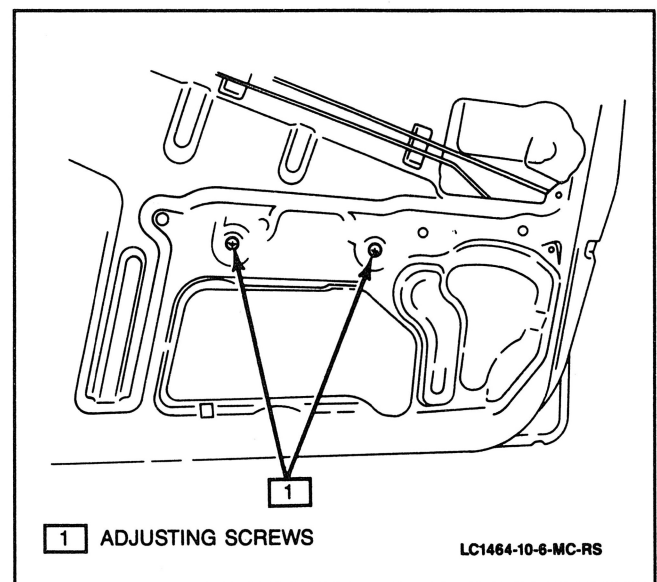


Figure 21 Window Regulator Adjusting Screws

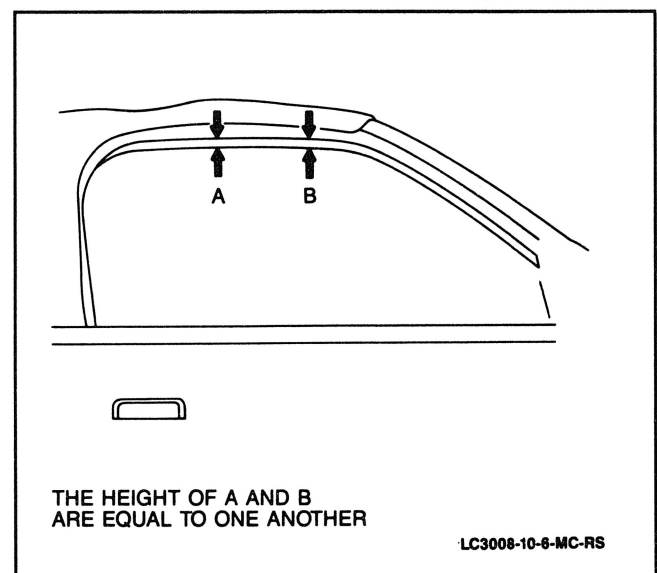


Figure 22 Correct Window Positioning

3. Glass assembly to door.
4. Two window regulator-to-glass mounting nuts.
5. Two door trim supports; secure each support with 1 screw.
6. Outer seal to door.



Adjust

- Temporarily tighten one of the upper retaining nuts and the lower retaining nut of the front sash at the centers of the oblong holes in the door panel (Figure 18).
- Temporarily tighten rear sash retaining nuts at the centers of the oblong holes in the door panel (Figure 18).
- Raise glass to its fully closed position.



Inspect

- Glass for correct front/rear and left/right position (Figures 19 and 20). Adjust as required.
- If the glass is not properly positioned, correct by adjusting retaining nuts (Figures 18 and 20).



Important

- If glass cannot be properly positioned using the above procedure, the convertible top must be adjusted. Refer to the ROOF AND CONVERTIBLE TOP (SEC.10-9) for adjustment procedures.



Tighten

- All front and rear sash mounting nuts to 13 N·m (115 lb.in.).
 - Window regulator so that measurements "A" and "B" are equal (Figure 22).
 - Apply adhesive to the back of the water deflector.
7. Water deflector to door.
 8. Inner mirror bezel to door.
 9. Front door interior trim. Refer to "Front Door Trim" earlier in this section.

REGULATOR

Figures 23 and 24



Remove or Disconnect

1. Door glass. Refer to "Glass" earlier in this section.

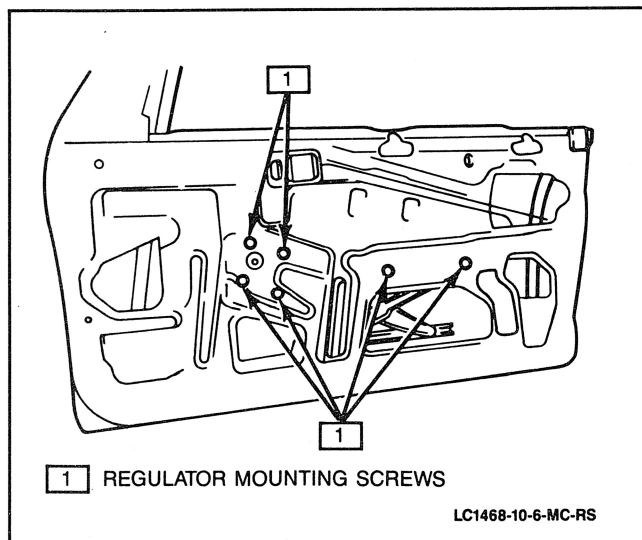


Figure 23 Window Regulator Mounting Screws

2. Six screws retaining regulator.
3. Regulator through large opening in door panel.



Inspect

- Gear and spring for wear or damage.



Install or Connect

- Apply a multipurpose grease to all lubrication points (Figure 24).
1. Window regulator to door; secure with 6 screws.
 2. Door glass. Refer to "Glass" earlier in this section.

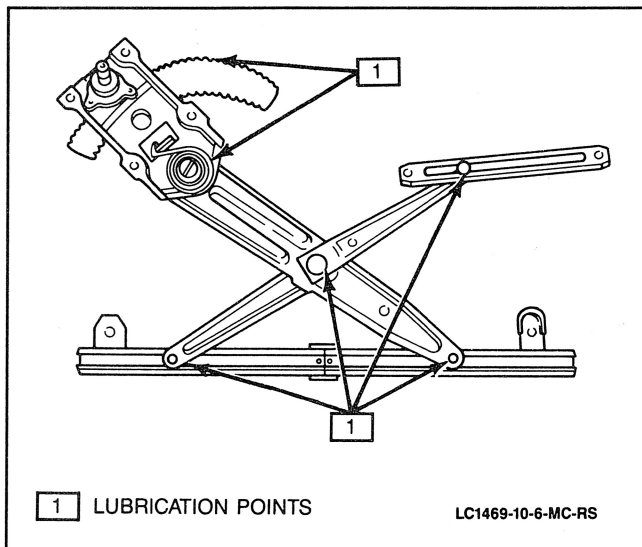


Figure 24 Window Regulator Lubrication Points

SPECIFICATIONS

FASTENER TORQUES

Outside Door Handle Retaining Bolts.....	7 N·m (62 lb.in.)
Door Hinge-to-Door Jamb Bolts	34 N·m (25 lb.ft.)
Door-to-Door Hinge Bolts	34 N·m (25 lb.ft.)
Glass Hardware Mounting Screws and Bolts	5 N·m (44 lb.in.)
Front and Rear Sash Mounting Nuts	13 N·m (115 lb.in.)

SECTION 10-7

REAR QUARTERS

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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Rear Speaker Trim Panel	10-7-1	Pressure Relief Valve	10-7-3
Passenger Compartment Quarter		Exterior Trim	10-7-4
Trim Panels	10-7-1	Quarter Molding	10-7-4
Convertible Top Storage Cradle	10-7-2	Fuel Filler Door	10-7-4
		Specifications	10-7-5
		Fastener Torques	10-7-5

GENERAL DESCRIPTION

REAR QUARTERS

This section contains information on attachments to the rear quarter area. Refer to **STATIONARY GLASS (SEC.10-2)** or **ROOF AND CONVERTIBLE TOP (SEC.10-9)** for service procedures pertaining to the backlite.

ON-VEHICLE SERVICE

INTERIOR TRIM

Rear Speaker Trim Panel

Figure 1

Remove or Disconnect

1. Six screws and 3 fasteners securing rear speaker trim panel.
2. Rear speaker trim panel from vehicle.

Install or Connect

1. Rear speaker trim panel to vehicle.
2. Six screws and 3 fasteners securing rear speaker trim panel.

Passenger Compartment Quarter Trim Panels

Figure 1

Remove or Disconnect

1. Six screws and 3 fasteners securing rear speaker trim panel.
2. Rear speaker trim panel from vehicle.
3. Safety belt lower anchor bolt.
4. Three fasteners securing the passenger compartment quarter trim panel.
5. Passenger compartment quarter trim panel from vehicle.

Install or Connect

1. Passenger compartment quarter trim panel to vehicle.
2. Safety belt lower anchor bolt.

Tighten

- Safety belt lower anchor bolt to 45 N·m (33 lb.ft.).
3. Three fasteners securing passenger compartment quarter trim panel.
 4. Rear speaker trim panel to vehicle.
 5. Six screws and 3 fasteners securing rear speaker trim panel.

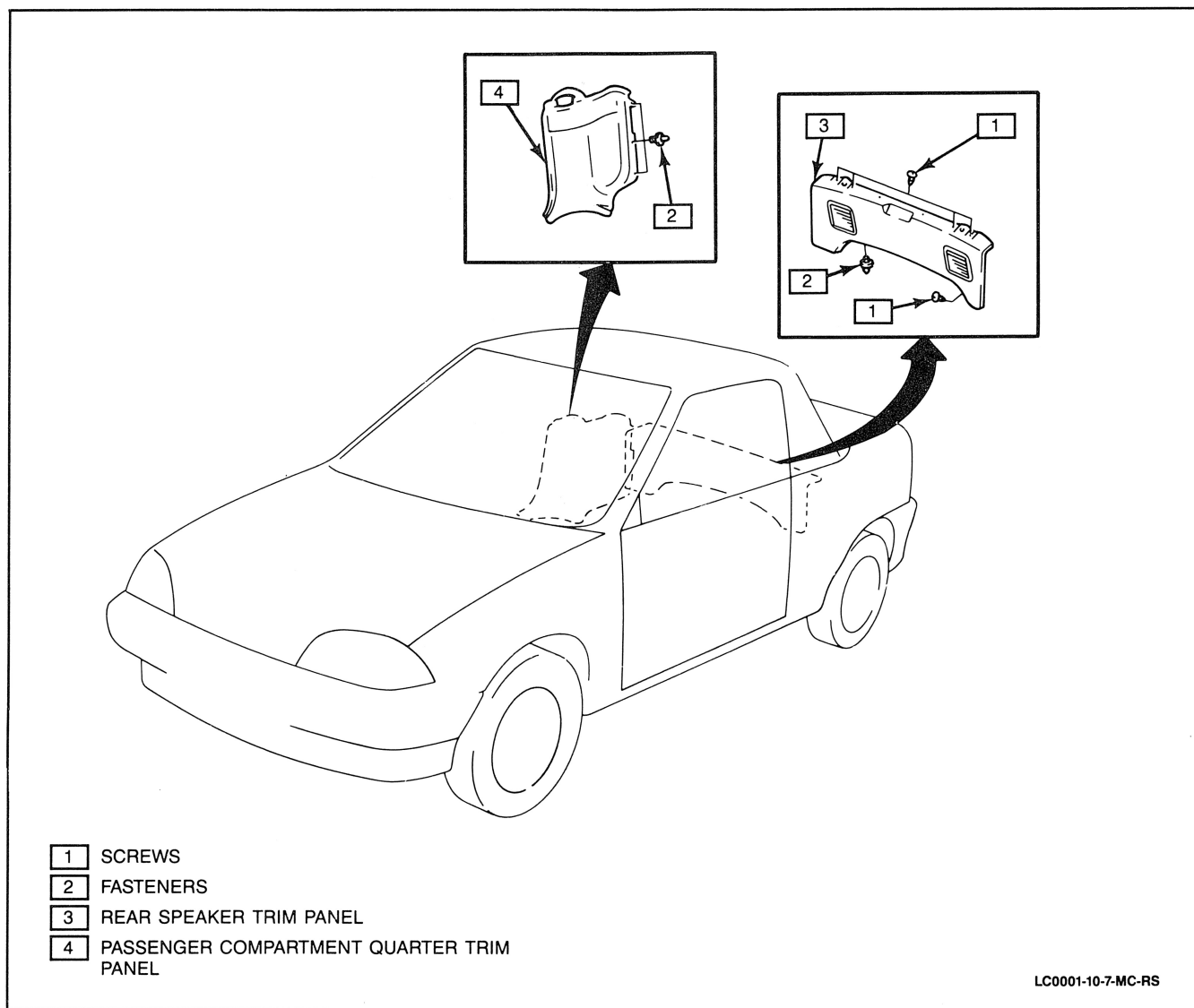


Figure 1 Interior Trim Components

Convertible Top Storage Cradle

Figure 2

↔ Remove or Disconnect

1. Six screws and 3 fasteners securing rear speaker trim panel.
2. Rear speaker trim panel from vehicle.
3. Screws securing convertible top storage cradle at rear speaker trim panel.
 - Raise deck lid.
4. Two screws securing convertible top storage cradle in luggage compartment.

→← Install or Connect

1. Convertible top storage cradle in vehicle.
2. Two screws securing convertible top storage cradle in luggage compartment.
3. Two screws securing convertible top storage cradle at rear speaker trim panel.
4. Rear speaker trim panel to vehicle.

5. Six screws and 3 fasteners securing rear speaker trim panel.

Center Tonneau Cover Latch Striker

Figure 2

↔ Remove or Disconnect

1. Two screws.
2. Latch striker from center tonneau cover.

→← Install or Connect

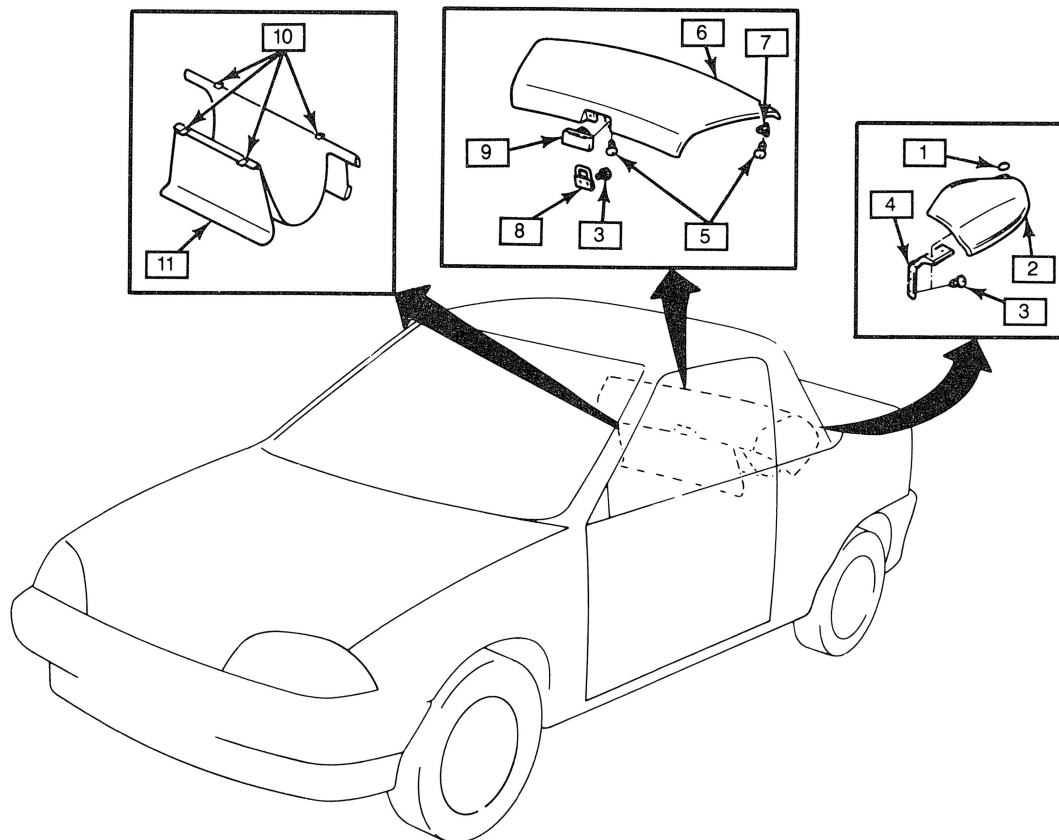
1. Latch to center tonneau cover.
2. Two screws securing latch striker.

Side Tonneau Covers

Figure 2

↔ Remove or Disconnect

1. Bolts securing side tonneau cover to vehicle.



- | | |
|------------------------|-----------------------------------|
| 1 RUBBER GUIDE | 7 GUIDE |
| 2 SIDE TONNEAU COVER | 8 LATCH STRIKER |
| 3 BOLTS | 9 RELEASE HANDLE |
| 4 HINGE | 10 SCREW LOCATIONS |
| 5 SCREWS | 11 CONVERTIBLE TOP STORAGE CRADLE |
| 6 CENTER TONNEAU COVER | |

LC0002-10-7-MC-RS

Figure 2 Interior Trim Pieces

2. Side tonneau cover from vehicle.

Install or Connect

1. Side tonneau cover in vehicle.
2. Bolts securing side tonneau cover.

Tighten

- Side tonneau cover-to-vehicle bolts to 15 N·m (11 lb.ft.).

Side Tonneau Cover Hinge

Figure 2

Remove or Disconnect

1. Bolts securing side tonneau cover to vehicle.
2. Side tonneau cover from vehicle.
3. Bolts securing hinge to side tonneau cover.
4. Hinge.

Install or Connect

1. Hinge to side tonneau cover.
2. Bolts securing hinge to side tonneau cover.

Tighten

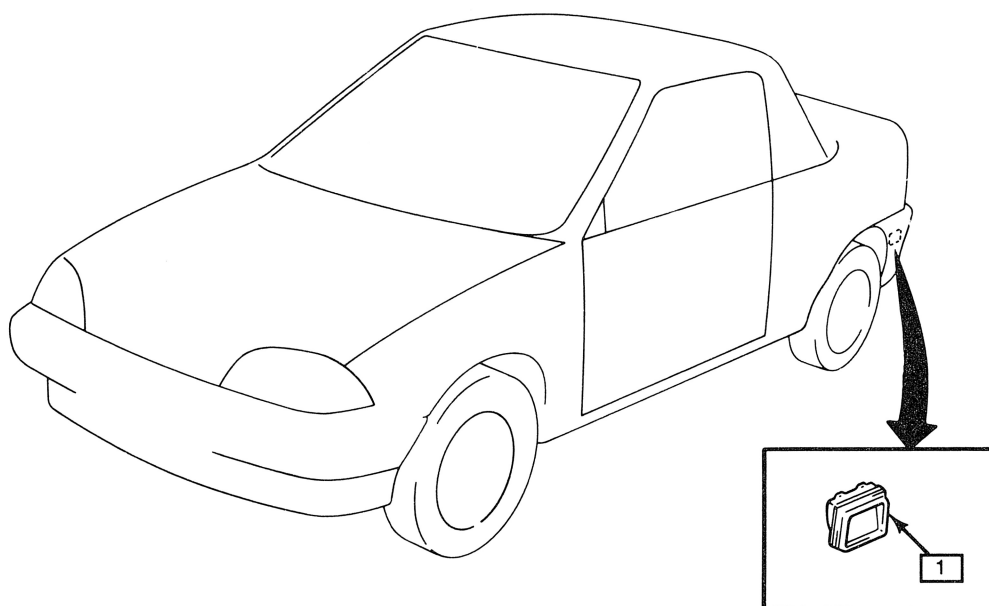
- Side tonneau cover-to-hinge bolts to 7 N·m (60 lb.in.).
3. Side tonneau cover to vehicle.
 4. Bolts securing side tonneau cover.

Pressure Relief Valve

Figure 3

Remove or Disconnect

1. Rear bumper fascia assembly. Refer to BUMPERS (SEC.10-4).
2. Pressure relief valve by prying it from cavity.



1 PRESSURE RELIEF VALVE

LC0003-10-7-MC-RS

Figure 3 Pressure Relief Valve

Install or Connect

1. Pressure relief valve by snapping it into place.
2. Rear bumper fascia assembly. Refer to BUMPERS (SEC.10-4).

Install or Connect

1. Metal retainer. Secure with 3 screws.
2. Quarter molding to metal retainer.
3. End cap to quarter molding.

EXTERIOR TRIM

Quarter Molding

Figure 4

Remove or Disconnect

1. End cap from quarter molding.
2. Quarter molding by sliding it off of metal retainer.
3. Three screws securing metal retainer.

Fuel Filler Door

Remove or Disconnect

1. Two screws securing fuel filler door and hinge assembly to vehicle.
2. Fuel filler door and hinge assembly.

Install or Connect

1. Fuel filler door and hinge assembly to vehicle.
2. Two screws securing fuel filler door and hinge assembly to vehicle.

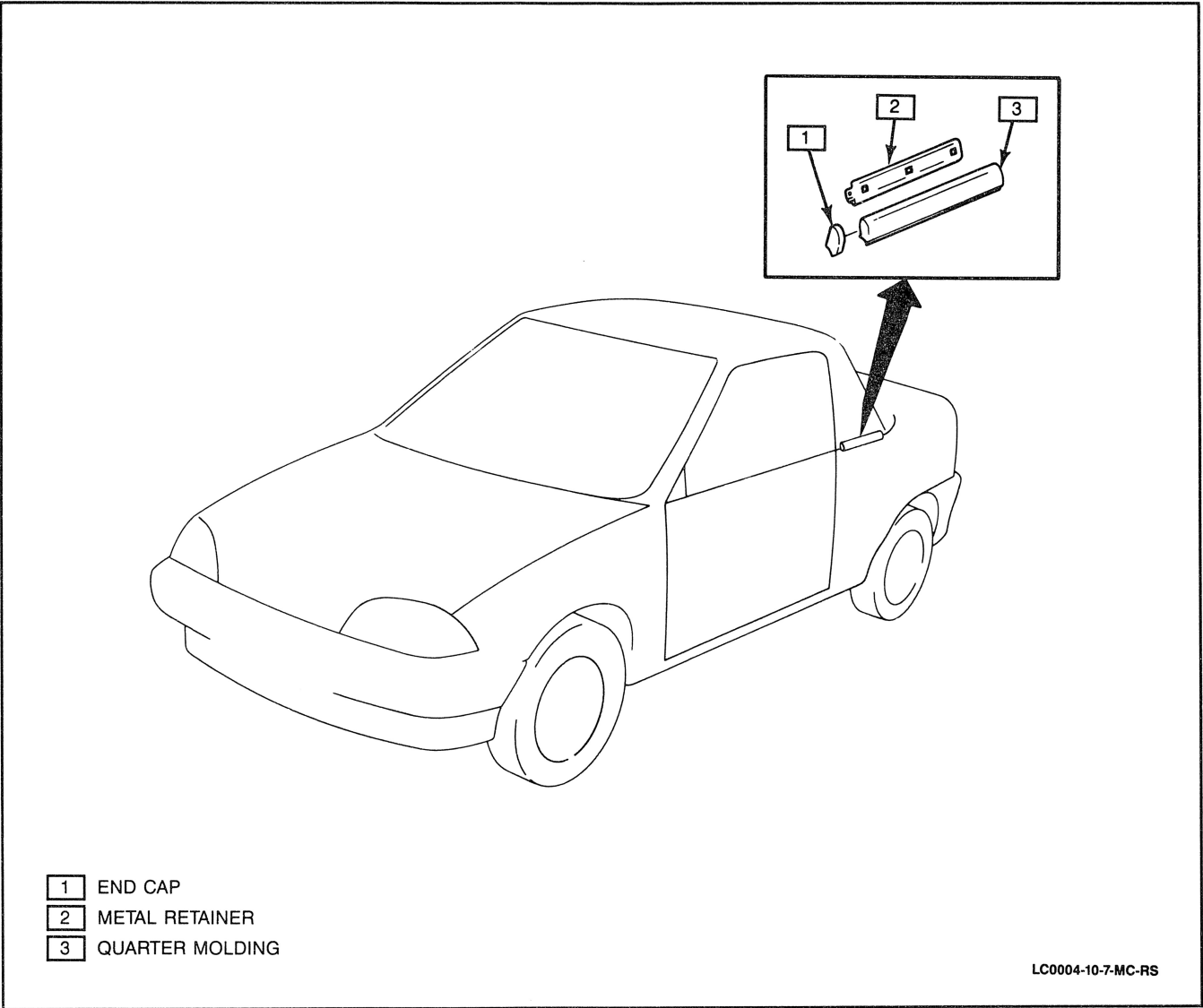


Figure 4 Quarter Molding

SPECIFICATIONS

FASTENER TORQUES

Safety Belt Lower Anchor Bolts	45 N·m (33 lb.ft.)
Side Tonneau Cover-to-Vehicle Bolts	15 N·m (11 lb.ft.)
Side Tonneau Cover-to-Hinge Bolts	7 N·m (60 lb.in.)

SECTION 10-8

BODY REAR END

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

BODY REAR END

Body rear end components include the rear deck lid, the rear end finishing panel, the luggage compartment trim and all related attaching hardware.

ON-VEHICLE SERVICE

REAR SPEAKERS

↔ Remove or Disconnect

1. Six screws and 3 fasteners securing rear speaker trim panel.
2. Rear speaker trim panel from vehicle.
3. Screws securing speaker to vehicle.
4. Disconnect electrical connector.
5. Speaker from vehicle.

→→ Install or Connect

1. Speaker to vehicle, connecting electrical connector.
2. Screws securing speaker to vehicle.
3. Rear speaker trim panel to vehicle.
4. Six screws and 3 fasteners securing rear speaker trim panel.

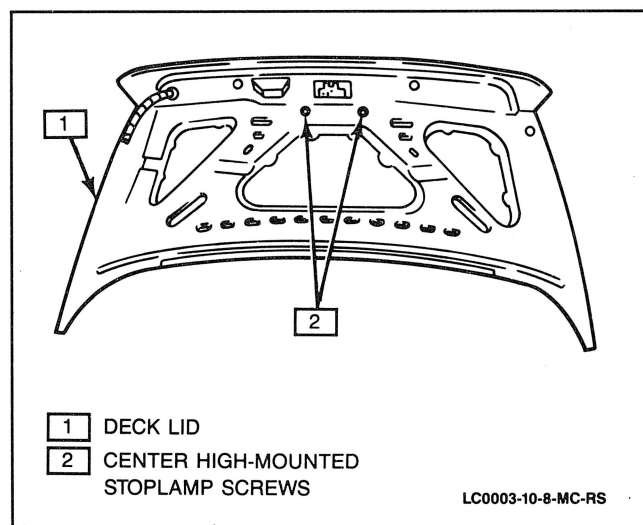


Figure 1 Center High-Mounted Stoplamp Screw Location

CENTER HIGH-MOUNTED STOPLAMP

Figures 1 and 2

↔ Remove or Disconnect

1. Battery negative (-) cable.
 - Raise deck lid.
2. Two screws securing center high-mounted stoplamp.
3. Center high-mounted stoplamp from deck lid, disconnecting electrical connector.

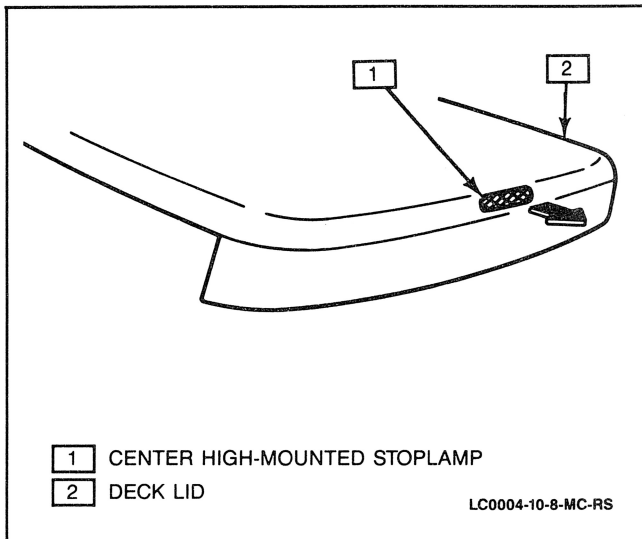


Figure 2 Center High-Mounted Stoplamp

Install or Connect

1. Center high-mounted stoplamp to deck lid, connecting electrical connector.
2. Two screws securing center high-mounted stoplamp to deck lid.
 - Lower deck lid.
3. Battery negative (-) cable.

EMBLEMS AND NAMEPLATES

Figure 3

Remove or Disconnect

1. Worn or damaged nameplate from vehicle.

Install or Connect

- Clean surface area where emblem or nameplate is to be adhered.
1. Nameplate to vehicle.

DECK LID

Figures 3 and 4

Remove or Disconnect

1. Battery negative (-) cable.
 - Raise and support deck lid.
2. Two screws securing center high-mounted stoplamp.
3. Center high-mounted stoplamp from deck lid, disconnecting electrical connector.
4. Screws securing right and left deck lid supports at deck lid.
5. Four bolts securing deck lid to hinges.
6. Deck lid from vehicle.

Install or Connect

1. Deck lid to vehicle.

2. Four bolts securing deck lid to hinges.
3. Screws securing right and left deck lid supports at deck lid.
4. Center high-mounted stoplamp to deck lid, connecting electrical connector.
5. Two screws securing center high-mounted stoplamp.

Adjust

- Deck lid by loosening bolts at hinges (Figure 4).

Tighten

- Deck lid-to-hinge bolts to 45 N·m (33 lb.ft.)

6. Battery negative (-) cable.

DECK LID SUPPORTS

Figures 3 and 5

Remove or Disconnect

- Raise and support deck lid.
1. Tape securing center high-mounted stoplamp wiring to left side deck lid support.
 2. Four screws securing left and right side deck lid supports to deck lid.
 3. Right and left side deck lid supports from ball mounts.
 4. Right and left side deck lid supports from vehicle.

Install or Connect

1. Right and left side deck lid supports to vehicle.
2. Right and left side deck lid supports to ball mounts.
3. Four screws securing right and left side deck lid supports to deck lid.
4. Center high-mounted stoplamp wiring by taping to left side deck lid support.

Important

- The deck lid support cylinders are gas-filled and should not be disassembled.
- Use the following procedure prior to discarding a support:
 - a) Wear safety glasses.
 - b) Wrap the support in a clean vinyl bag.
 - c) Release gas pressure by drilling a 2 to 3 mm (0.08 to 0.12-inch) hole through vinyl bag and into support (Figure 5).
- When installing a new support, be very careful not to scratch its surface, and never allow dirt or oil to contact its surface.

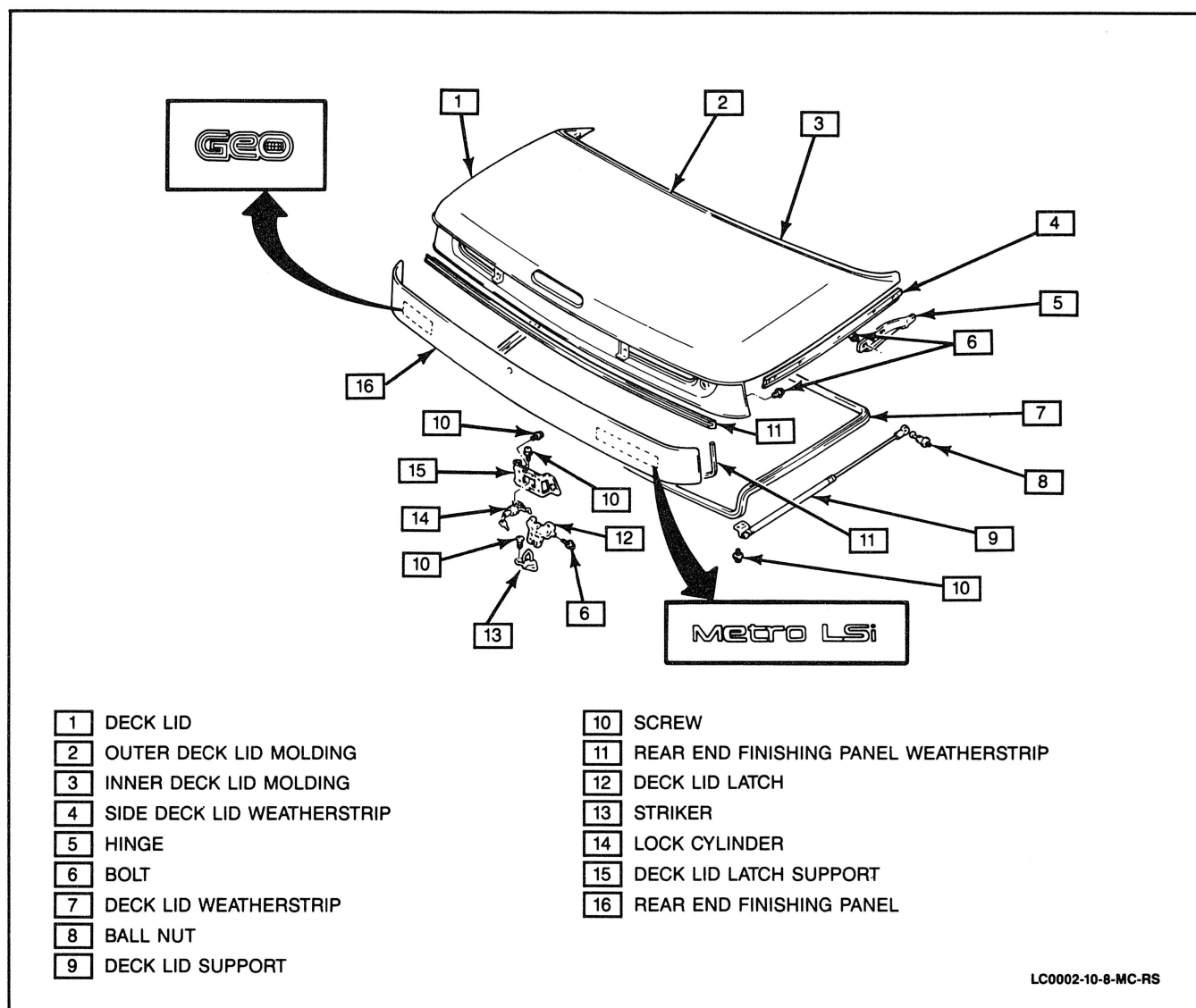


Figure 3 Deck Lid and Associated Components

DECK LID LATCH

Figures 3 and 6

Remove or Disconnect

1. Two screws securing deck lid latch to deck lid.
2. Deck lid latch from deck lid.

Install or Connect

1. Deck lid latch to deck lid.
2. Two screws securing deck lid latch to deck lid.

STRIKER

Figures 3 and 6

Remove or Disconnect

1. Luggage compartment rear trim panel. Refer to "Luggage Compartment Trim" later in this section.
2. Two screws securing striker to vehicle.

3. Striker from vehicle.

Install or Connect

1. Striker to vehicle.
2. Two screws securing striker to vehicle.
3. Luggage compartment rear trim panel. Refer to "Luggage Compartment Trim" later in this section.

Adjust

- Striker by loosening two screws and moving striker left, right, fore, and aft for proper alignment (Figure 6).

LOCK CYLINDER

Figure 3

Remove or Disconnect

1. Two screws securing deck lid latch to deck lid.
2. Deck lid latch from deck lid.

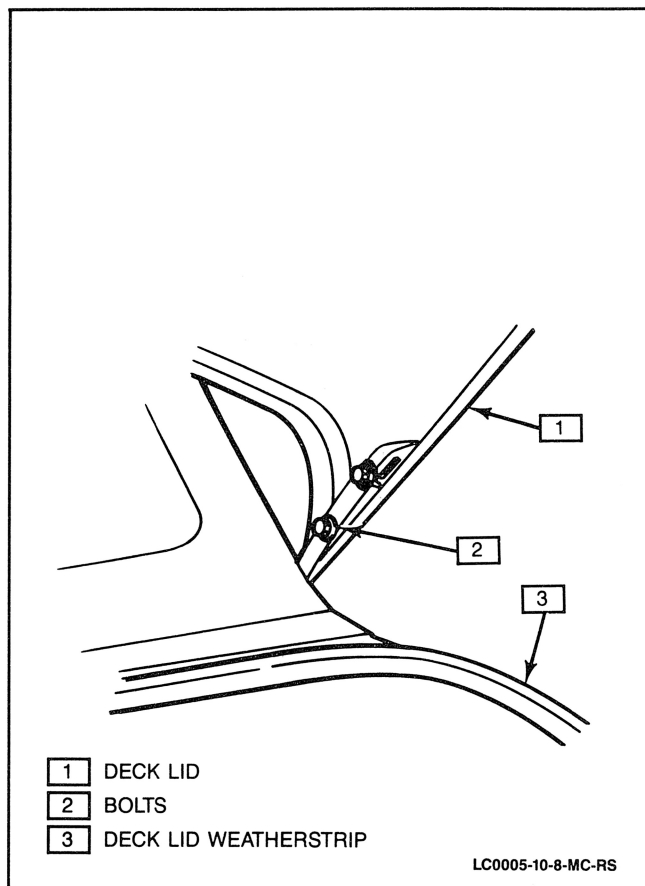


Figure 4 Deck Lid Mounting Bolts

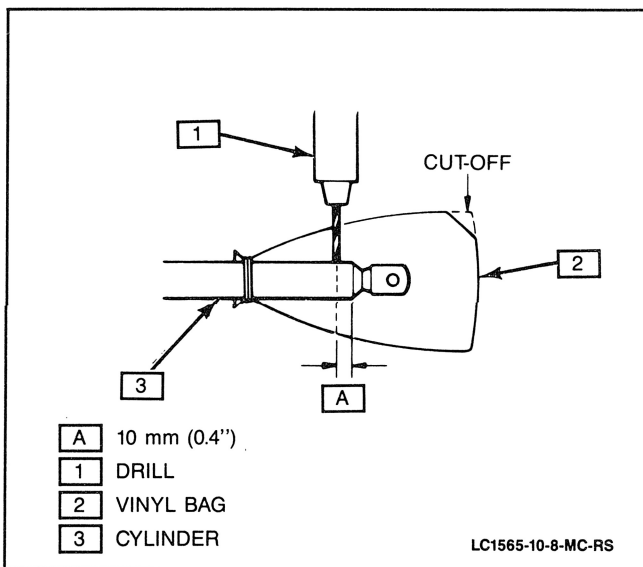


Figure 5 Discarding Cylinder

3. One screw securing lock cylinder to deck lid.
4. Lock cylinder.

Install or Connect

1. Lock cylinder to vehicle.
2. One screw securing lock cylinder to deck lid.
3. Deck lid latch to deck lid.
4. Two screws securing deck lid latch to deck lid.

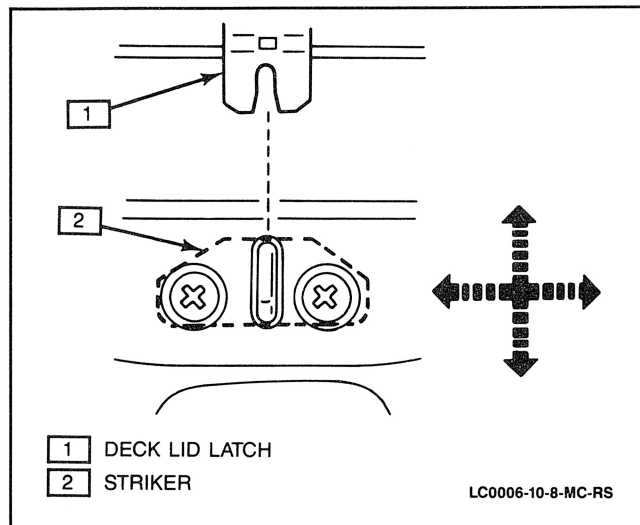


Figure 6 Deck Lid Latch and Striker Adjustment

WEATHERSTRIP

Figure 3

Remove or Disconnect

1. Luggage compartment rear trim panel. Refer to "Luggage Compartment Trim" later in this section.
2. Weatherstrip from luggage compartment by pulling weatherstrip upward from vehicle.

Install or Connect

- Apply a thin bead of weatherstrip adhesive around the perimeter of the pinch-weld flange.
- 1. Weatherstrip to the pinch-weld flange.
- 2. Luggage compartment rear trim panel. Refer to "Luggage Compartment Trim" later in this section.

DECK LID SIDE WEATHERSTRIP

Figure 3

Remove or Disconnect

- Pull deck lid side weatherstrip off deck lid.

Install or Connect

- Apply weatherstrip adhesive to deck lid side weatherstrip.
- Weatherstrip to side of deck lid.

DECK LID MOLDING

Figure 3

Remove or Disconnect

1. One screw and 1 fastener securing outer section of deck lid molding.
2. Outer section of deck lid molding.
3. Inner section of deck lid molding by pulling molding away from deck lid.

Install or Connect

- Apply a thin bead of weatherstrip adhesive to the inner section of the deck lid molding.
- 1. Inner section of deck lid molding to the deck lid and press into place.
- 2. Outer section of deck lid molding to deck lid.
- 3. One screw and 1 fastener securing the outer deck lid molding.

SPARE TIRE COVER PANELS

Remove or Disconnect

- Raise the deck lid.
- Luggage compartment carpeting, insulation and spare tire cover from vehicle.

Install or Connect

- Luggage compartment spare tire cover, insulation and carpeting to vehicle.

REAR END FINISHING PANEL

Figure 3

Remove or Disconnect

1. Four screws and 2 nuts securing rear end finishing panel to deck lid.
2. Rear end finishing panel and weatherstrips from vehicle.

Install or Connect

1. Rear end finishing panel and weatherstrips to vehicle.
2. Four screws and 2 nuts securing rear end finishing panel to deck lid.

REAR COMBINATION LAMPS

Remove or Disconnect

- Raise and support deck lid.
- 1. Two screws securing rear combination lamp assembly to vehicle.
- 2. Bulb sockets from rear combination lamp assembly.
- 3. Rear combination lamp assembly from vehicle.

Install or Connect

1. Rear combination lamp assembly to vehicle.
2. Bulb sockets to rear combination lamp assembly.
3. Two screws securing rear combination lamp assembly to vehicle.

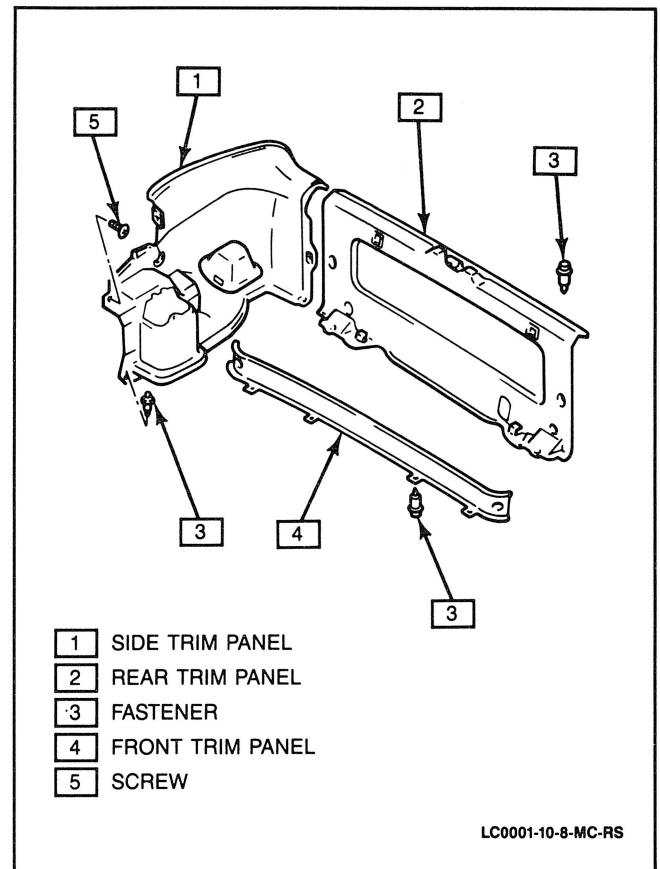


Figure 7 Luggage Compartment Trim

LUGGAGE COMPARTMENT TRIM

Figure 7

Remove or Disconnect

1. Eight fasteners securing luggage compartment rear trim panel.
2. Luggage compartment rear trim panel from vehicle.
3. Six fasteners securing luggage compartment front trim panel.
4. Luggage compartment front trim panel from vehicle.
5. Two fasteners and 1 screw securing luggage compartment side trim panel.
6. Luggage compartment side trim panel from vehicle.

Install or Connect

1. Luggage compartment side trim panel to vehicle.
2. Two fasteners and 1 screw securing luggage compartment side trim panel.
3. Luggage compartment front trim panel to vehicle.
4. Six fasteners securing luggage compartment front trim panel to vehicle.
5. Luggage compartment rear trim panel to vehicle.
6. Eight fasteners securing luggage compartment rear trim panel.

SPECIFICATIONS

FASTENER TORQUE

Deck Lid-to-Hinge Bolts45 N•m (33 lb.ft.)

SECTION 10-9

ROOF AND CONVERTIBLE TOP

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

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NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

ROOF AND FOLDING TOP

The convertible features an aerodynamically styled lightweight top, which is manually operated. The top material is smooth, durable vinyl that acts as a noise and heat insulator. The top is stored in a covered well behind the front seats.

ON-VEHICLE SERVICE

SUNSHADE

Figure 1

Remove or Disconnect

1. Two screws securing sunshade to windshield header.
2. Sunshade from vehicle.
3. One screw securing sunshade inner support to windshield header.
4. Inner support from windshield header.

Install or Connect

1. Inner support to windshield header.
2. One screw securing sunshade inner support to windshield header.
3. Sunshade to windshield header; secure with 2 screws.

INTERIOR LIGHTING (DOME LAMP)

Figure 2

Remove or Disconnect

1. Battery negative (-) cable.
2. Dome lamp lens by gently prying off with a screwdriver.
3. Dome lamp bulb by pulling straight out.

Install or Connect

1. Dome lamp bulb.
2. Dome lamp lens.
3. Battery negative (-) cable.

FOLDING CONVERTIBLE TOP

Operation

CAUTION: The folding top is provided only to offer some protection against undesirable weather conditions. It is not designed to hold occupants inside the vehicle, or to protect against the intrusion of foreign objects in the event of an accident. Occupants should wear safety belts whenever traveling in the vehicle.

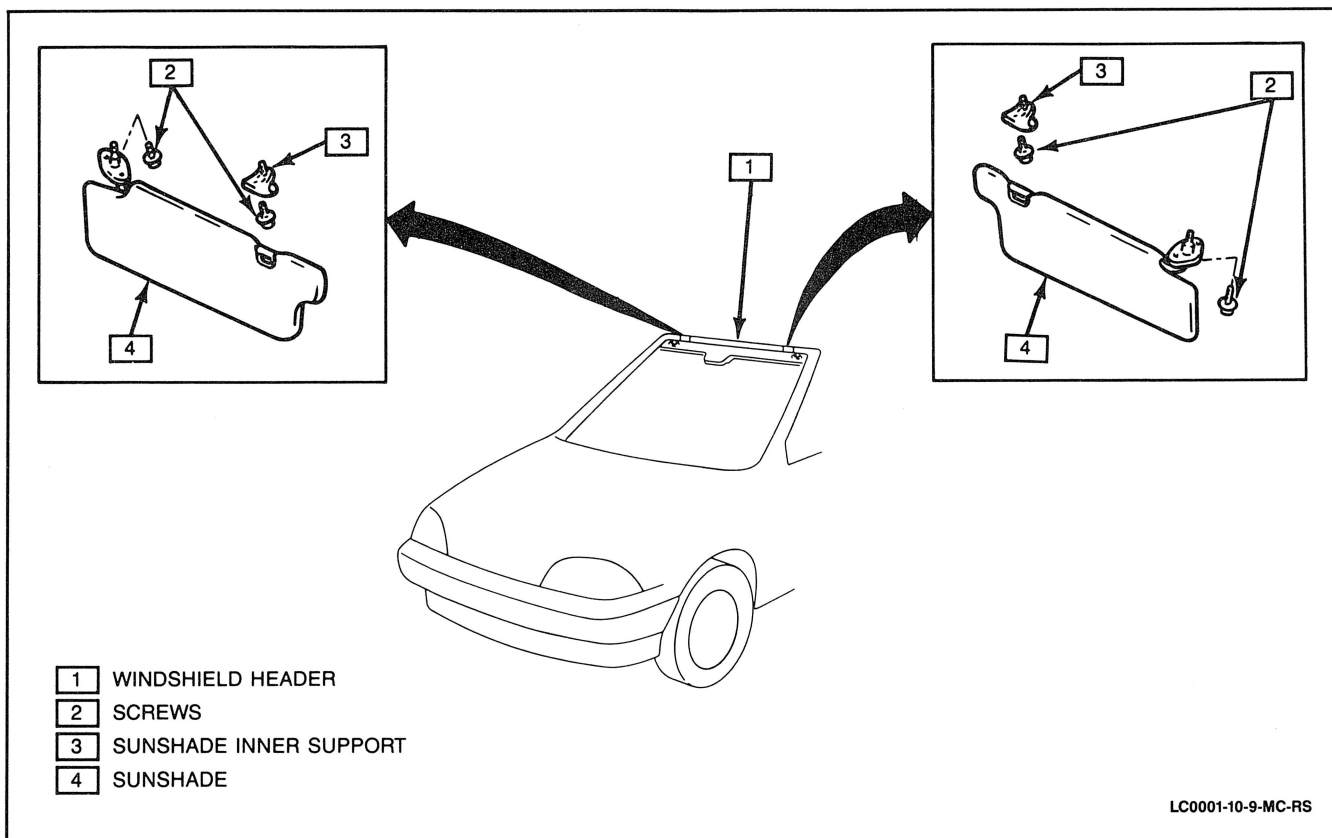


Figure 1 Sunshade

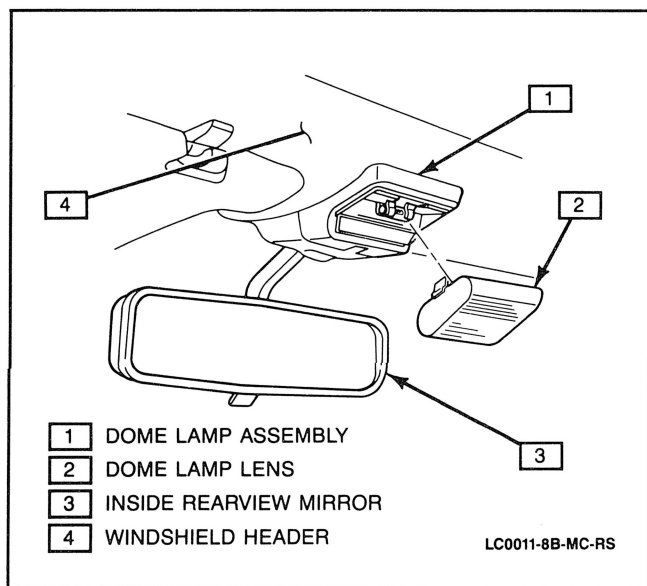


Figure 2 Dome Lamp

CAUTION: Never attempt to open the folding top while driving. You may lose control of the vehicle or may damage the folding top.

CAUTION: Never stand in the vehicle or sit on the folded top (top cover) while driving. Occupants who are not properly restrained can be severely injured in case of a sudden maneuver or an accident.

CAUTION: When opening or closing the top, keep hands clear from the front end, hinges and linkage of the top. Otherwise, your hand can get caught and be injured.

CAUTION: Before driving, make sure that the front of the top is securely locked to the windshield frame or the top is completely opened and covered.

NOTICE: The following circumstances may be damaging to the folding top:

- Opening or closing the top when the temperature is below 5° C (41° F).
- Taking the vehicle through an automatic car wash.
- Driving the vehicle when the top is not fully closed or fully open.
- Opening the top while some items may be in the top storage compartment.
- Sitting or putting excessive weight on the top or the top covers with the top opened or closed.
- Opening the top when it is not dry.
- Opening or closing the top with the deck lid opened.

Opening the Folding Top

Figures 3 through 6

1. Unfasten the strap at the number 3 (rear) bow.
2. Lower the number 3 (rear) bow.
3. Unlatch the folding top at the windshield header.

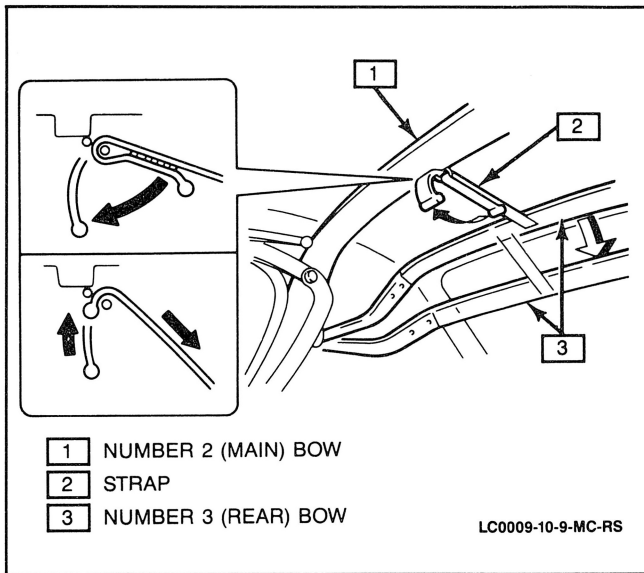


Figure 3 Number 3 (Rear) Bow Strap

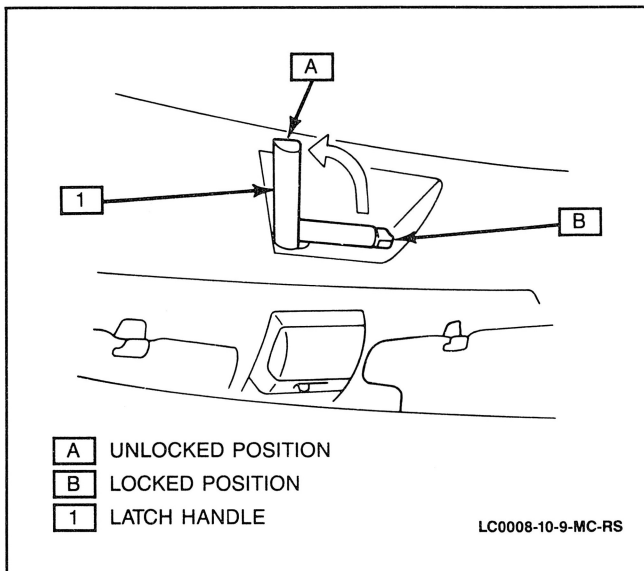


Figure 4 Folding Top Latch

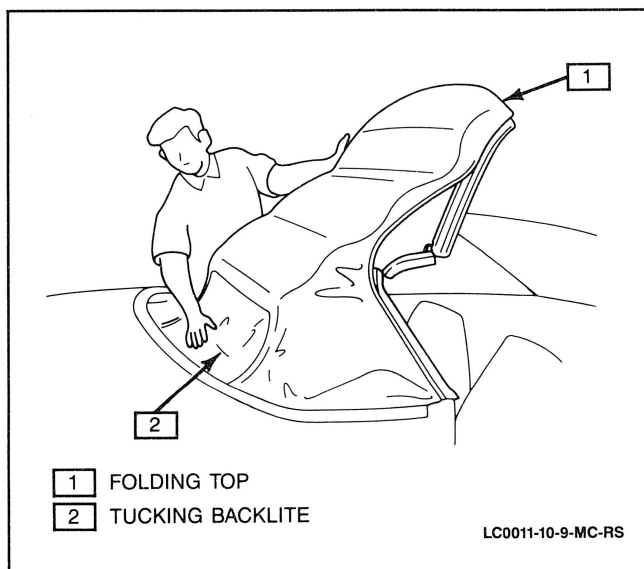


Figure 5 Tucking Top at Rear

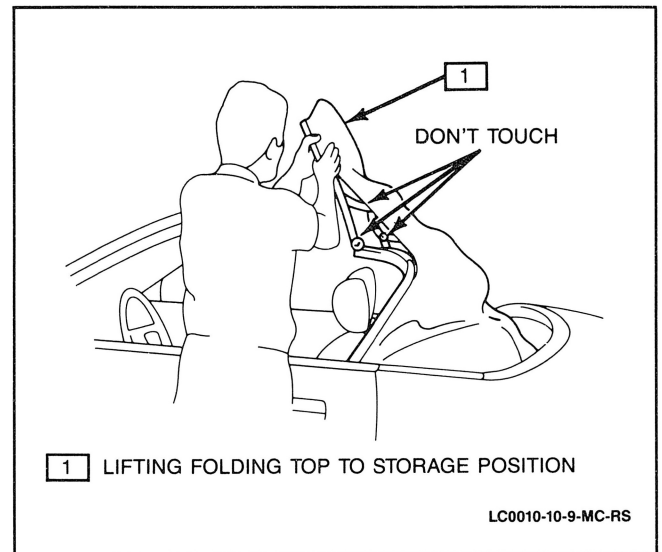


Figure 6 Lowering Top

4. Remove the center piece of the top cover.
5. Pivot the side covers inward.
6. Lift the folding top off of the windshield header with one hand while tucking the backlite inward.
7. Fold the folding top into the storage area completely.

CAUTION: Be sure to keep hands clear from the folding top linkage and hinge components.

8. With the folding top completely folded into the storage area, pivot the side covers back to their normal position.
9. Install the center piece of the top cover.

Closing the Folding Top

1. Remove the center piece of the top cover.
2. Pivot the side covers inward.
3. Lift the folding top out of the storage area.
4. Position the folding top to the windshield header.
5. Pivot the side covers back to their normal positions.
6. Install the center piece of the top cover.
7. Fasten the strap to the number 3 bow and tighten the strap.
8. Latch the folding top to the windshield header.

Maintenance

Cleaning the Vinyl Top

Wash the folding top often with neutral soap suds, lukewarm water and a brush with soft bristles. Rinse the top with plenty of clean water to remove all traces of soap.

If the folding top requires additional cleaning, you can use a mild foaming cleaner such as GM Multi-Purpose Powdered Cleaner. Do not use volatile type cleaners or household bleaching agents on the top material.

Cleaning Plastic Backlite

The plastic backlite is made of a very pliable material that can easily be scratched. Listed are a series of precautions you should take to help prevent the plastic backlite from sustaining damage.

- To wipe off dust, use a soft cotton cloth moistened with lukewarm or cold, clean water. Move the cloth in one direction without stopping. Never use a dry cloth.
- To remove frost, snow or ice, use lukewarm water without using any scraper or de-icing chemicals.
- To wash the backlite, be sure to use lukewarm or cold water. Do not use hot water or any strong soap or detergents. Never use solvents such as alcohol or harsh cleaning agents. After a thorough rinse, wipe with a soft and slightly moist, clean cloth.
- Never paste stickers, gummed labels or any tape to the backlite. It is very hard to remove adhesives left on the backlite after removing stickers and labels. Removing such adhesives forcibly or with solvents may damage the backlite. If adhesives on the backlite are still soft and sticky, they may be removed by repeated sticking-and-removing action with another new sticker or tape.

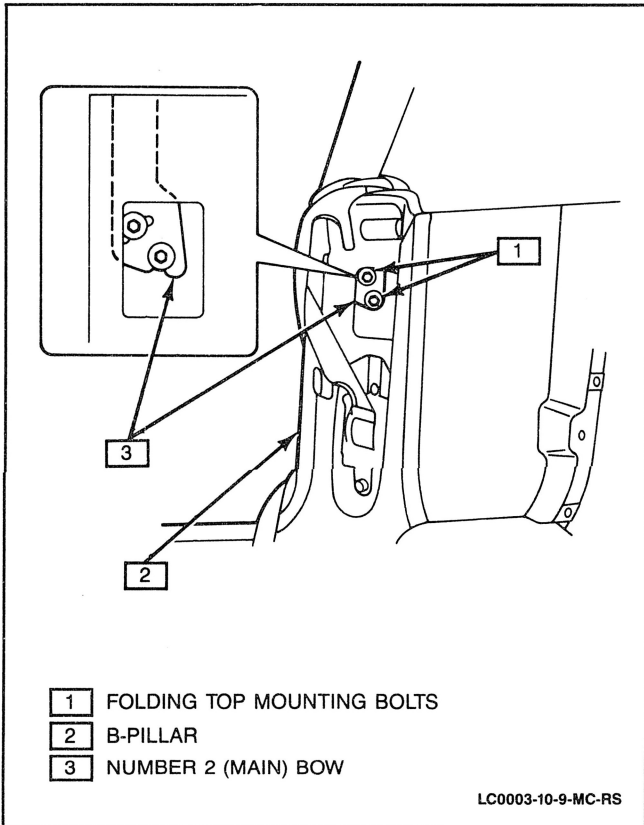


Figure 7 Folding Top Adjustment

Figure 7

Adjustments

The folding top may be adjusted as a unit by loosening 2 mounting bolts per side of the unit, located at the base of the number 2 (center) bow. The

weatherstrip located on the number 2 (center) bow should be parallel with the door glass when the folding top is properly adjusted.

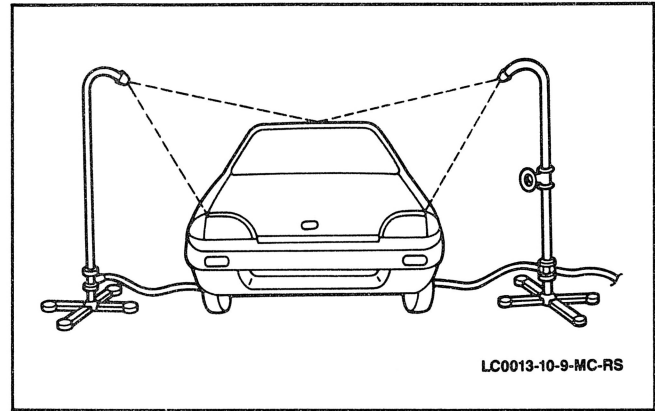


Figure 8 Water Test Stands Positioned for Testing

Water Test and Water Leak Procedures

Figures 8 and 9

General Motors vehicles are designed to operate under normal environmental conditions. The design criteria for sealing materials and components takes into consideration the sealing forces required to withstand the natural elements. These specifications do not, and cannot, take into consideration all artificial conditions (i.e., high-pressure car washes).

The water test procedure has been correlated to the natural elements and will determine the ability of a car to perform under normal operating conditions.

Repairing body water leaks is a problem of proper testing, diagnosis, and repair through adjustment of misaligned components and/or application of proven repair materials. The first step in water leak diagnosis is finding the conditions under which the leak occurs (for example, leak noticed only when parked on an inclined drive or water in spare tire compartment).

If the general leak area can be found, the exact entry point can be quickly isolated by use of a localized test such as a water hose or air hose. If the leak source is not obvious, the generalized testing method using water equipment such as the water test stands should be used. It may be necessary to remove some interior trim panels or components to locate and confirm repairs.

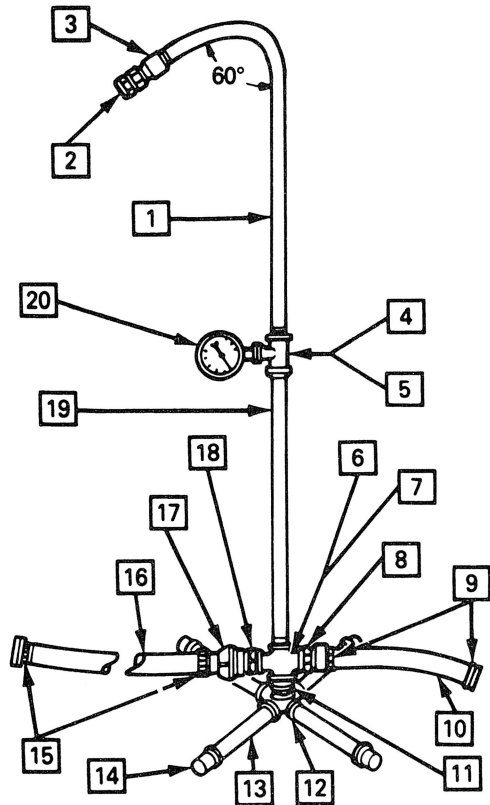
Generalized Testing

Specifications for construction of the water test stand are shown in Figure 9.

If the specified water pressure of 155 kPa (22 psi) cannot be obtained because of a local situation, both test stands may be moved toward the vehicle body until water spray overlap can be obtained.

Localized Testing (Stop Test)

Localized testing may be made with either water or air. Begin test at the base of the suspected area and continue up slowly until the leak is located.



- 1** 1/2" × 36" PIPE
- 2** FULL-JET SPRAY NOZZLE #1/2 GG-25 OR EQUIVALENT NOZZLE HEIGHT-64" TO FLOOR
- 3** 1/2" COUPLING
- 4** 1/2" × 1/2" × 1/4" REDUCING TEE (RIGHT ONLY)
- 5** 1/2" COUPLING (LEFT ONLY)
- 6** 1/2" CROSS (RIGHT ONLY)
- 7** 1/2" TEE (LEFT ONLY)
- 8** 1/2" PIPE TO HOSE NIPPLE (RIGHT ONLY)
- 9** 5/8" FEMALE HOSE COUPLING
- 10** 2' INPUT HOSE (5/8" DIA.) RIGHT ONLY
- 11** 1/2" CLOSE NIPPLE
- 12** 1/2" CROSS WITH WELD-ON 1/2" CAP
- 13** 1/2" × 12" NIPPLE
- 14** 1/2" CAP
- 15** 5/8" FEMALE HOSE COUPLING
- 16** 12' CROSS HOSE (5/8" DIA.)
- 17** HOSE QUICK CONNECT
- 18** 1/2" PIPE TO HOSE NIPPLE
- 19** 1/2" × 30" PIPE (STRAIGHT)
- 20** WATER PRESSURE GAGE (RIGHT SIDE)

H60090-101-V

Figure 9 Water Test Stand

! Important

- Pinpoint the leak area before any repair is made. Random repair may only temporarily restrict water entry and make future diagnosis and repair more difficult.

Continue localized testing in the same general area to confirm that all leaks have been located.

Water Hose Test

- Have an assistant inside the vehicle to detect the actual leak point.
- Use unrestricted water flow (no nozzle).
- Begin at base of suspected water leak area and move upward slowly.

Air Hose Test

- Apply bubble solution (liquid soap) to suspected area.
- Apply air pressure with an air hose from inside the vehicle. Do not exceed 205 kPa (30 psi).
- Observe for outside bubbles at suspected leak area.

Water Leak Repair

To locate the exact leak point or to repair the leak, it may be necessary to remove some interior trim panels or components.

After completion of any water leak repair, the general area should be retested using the water test stand. Do not use air hose or water hose to test repaired areas as the repair material may dislodge under abnormal pressure.

FOLDING TOP COVER AND BACKLITE

Figures 10 and 11

↔ Remove or Disconnect

1. Folding top assembly. Refer to "Stacking Assembly" later in this section.
2. Four bolts securing header to side links.
3. Eight screws securing bows to side links.
4. Side weatherstrips from number 2 (main) bow.
5. Six screws securing the fabric to the header.
6. Fabric from folding top assembly.

↔ Install or Connect

1. Fabric to folding top assembly.
2. Six screws securing the fabric to the header.
3. Side weatherstrips to number 2 (main) bow.
4. Eight screws securing bows to side links.
5. Four bolts securing header to side links.

⌚ Tighten

- Header-to-folding top assembly bolts to 18 N·m (13 lb.ft.).
6. Folding top assembly. Refer to "Stacking Assembly" later in this section.

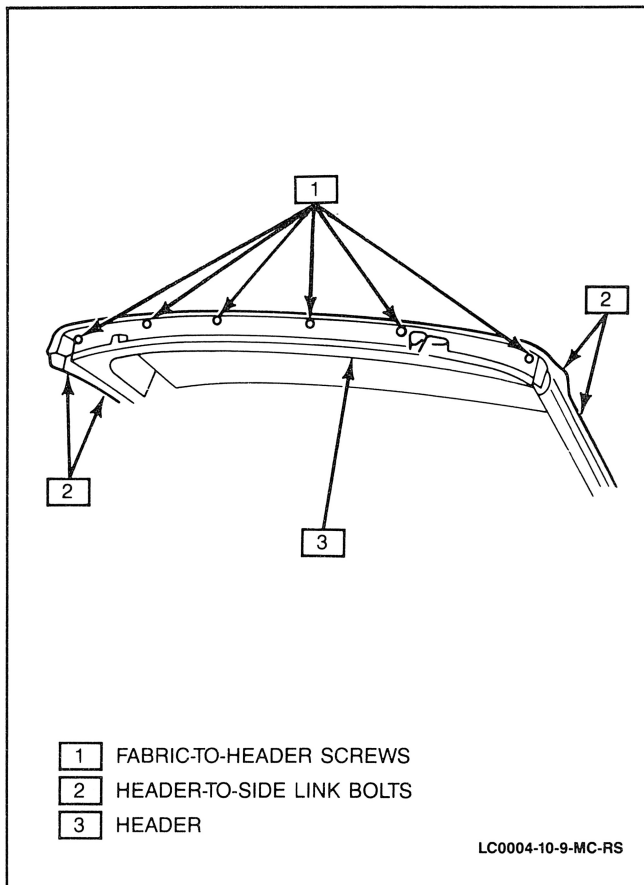


Figure 10 Header and Retainers

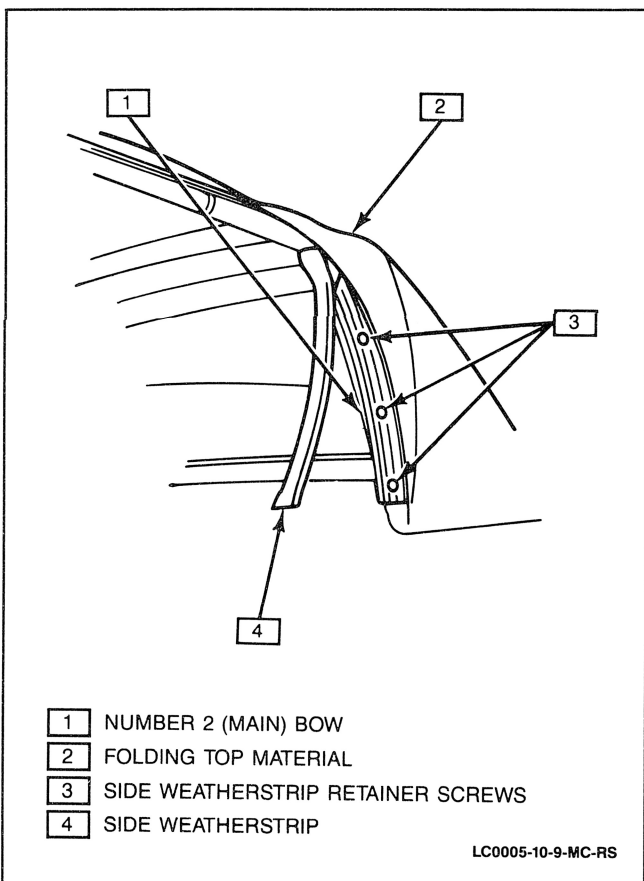


Figure 11 Side Weatherstrips

Weatherstrip Seals

Figure 11

Remove or Disconnect

1. Front, center and side weatherstrips from retainers.
2. Screws securing retainers to folding top assembly.
3. Retainers from folding top assembly.

Install or Connect

1. Front, center and side weatherstrip retainers to the folding top assembly and secure with screws.
 - Apply a thin bead of weatherstrip adhesive to the front, center and side weatherstrip retainers.
2. Front, center and side weatherstrips into their respective retainers.



Adjust

- Weatherstrips within their retainers so that they are evenly butted together.
- Allow the adhesive to cure.
- Water test the folding top to verify proper weatherstrip alignment.

Latch Assembly

Figure 12

Remove or Disconnect

1. Four bolts securing header to side links.
2. One screw securing handle to latch.
3. Handle from latch.
4. Two screws securing latch to header.
5. Four screws securing connecting rods to latch pivot bracket and latch locks.
6. Two screws securing latch locks to header.
7. Six screws securing front seal to header.
8. Front seal from header.

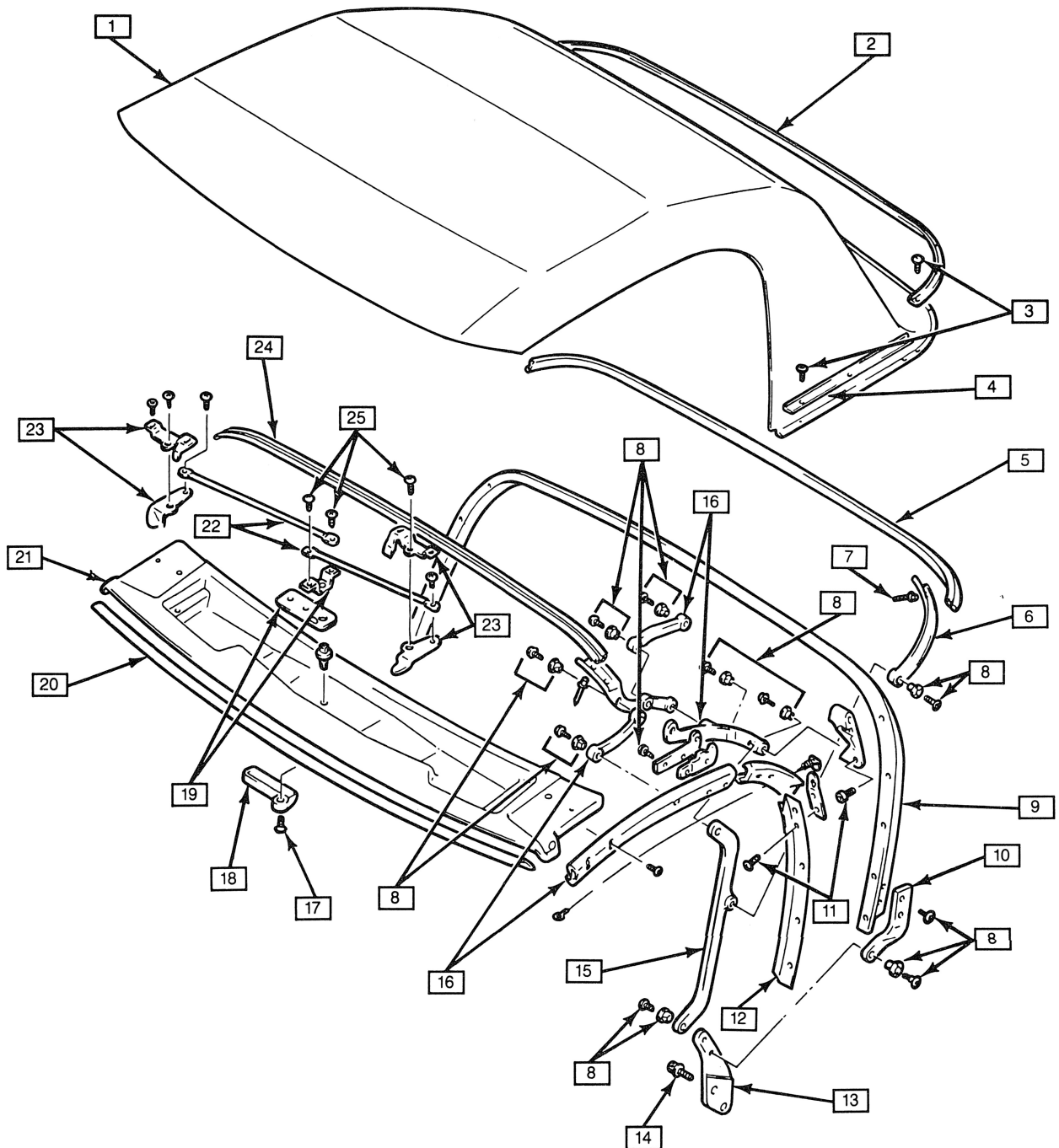
Install or Connect

1. Latch locks to header; secure with 2 screws.
2. Connecting rods to latch pivot bracket and latch locks; secure with 4 screws.
3. Latch to header; secure with 2 screws.
4. Handle to latch; secure with 1 screw.
5. Header to side links; secure with 4 bolts.



Tighten

- Header-to-folding top assembly bolts to 18 N·m (13 lb.ft.).
6. Front seal to header; secure with 6 screws.



- 1 FOLDING TOP MATERIAL
- 2 RETAINER
- 3 SCREW
- 4 QUARTER MOLDING RETAINER
- 5 NUMBER 3 (REAR) BOW
- 6 PIVOT BRACKET
- 7 RIVET
- 8 BOLTS AND WASHERS
- 9 NUMBER 2 (MAIN) BOW

- 10 NUMBER 2 (MAIN) BOW LOWER PIVOT BRACKET
- 11 SCREWS
- 12 WEATHERSTRIP RETAINER
- 13 ADJUSTMENT BRACKET
- 14 MOUNTING BOLT
- 15 NUMBER 2 (MAIN) SUPPORT ARMS
- 16 SIDE LINKS
- 17 SCREW
- 18 LATCH HANDLE

- 19 LATCH
- 20 HEADER SEAL
- 21 HEADER
- 22 RODS
- 23 LATCH LOCKS
- 24 NUMBER 1 (FRONT) BOW
- 25 SCREWS

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Figure 12 Folding Top Assembly Components

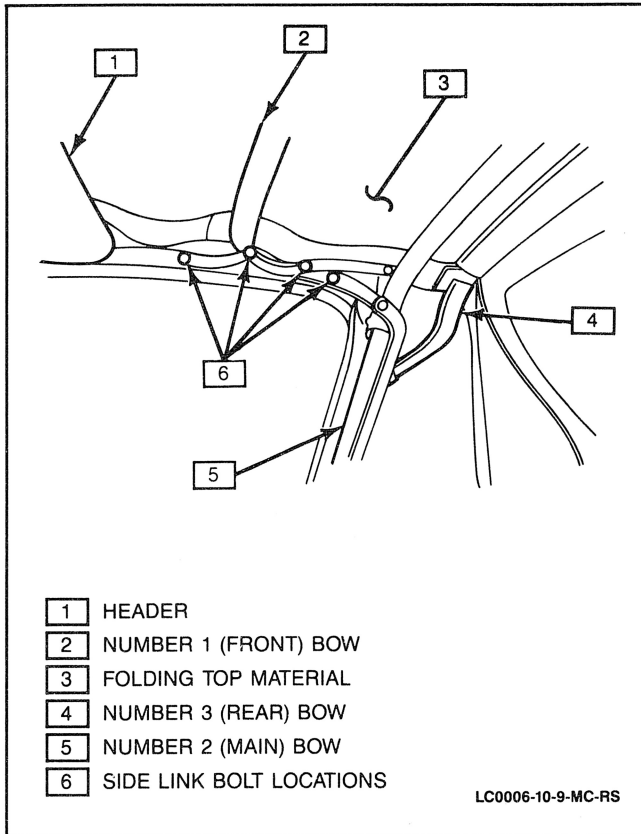


Figure 13 Folding Top Components

Roof Bows

Figures 12 and 13

Number 1 (Front) Bow

Remove or Disconnect

1. Bolts and washers securing number 1 (front) bow assembly to side links.
2. Number 1 (front) bow assembly from side links.
3. Rivets securing number 1 (front) bow to pivot brackets.
4. Pivot brackets from number 1 (front) bow.

Install or Connect

1. Pivot brackets to number 1 (front) bow.
2. Rivets securing number 1 (front) bow to pivot brackets.
3. Number 1 (front) bow assembly to side links.
4. Bolts and washers securing number 1 (front) bow assembly to side links.

Number 2 (Main) Bow

Remove or Disconnect

1. Bolts and washers securing side links to number 2 (main) bow assembly.
2. Side links from number 2 (main) bow assembly.
3. Two bolts and washers securing number 3 (rear) bow assembly to number 2 (main) bow assembly.

4. Number 3 (rear) bow assembly from number 2 (main) bow assembly.
5. Four bolts and washers securing number 2 (main) bow to lower pivot bracket.
6. Number 2 (main) bow support arms from adjustment brackets.
7. Number 2 (main) bow from lower pivot bracket.

Install or Connect

1. Number 2 (main) bow to lower pivot bracket.
2. Number 2 (main) bow support arms to adjustment brackets.
3. Four bolts and washers securing number 2 (main) bow to lower pivot bracket.
4. Number 3 (rear) bow assembly to number 2 (main) bow assembly.
5. Two bolts and washers securing number 3 (rear) bow assembly to number 2 (main) bow assembly.
6. Side links to number 2 (main) bow assembly.
7. Bolts and washers securing number 2 (main) bow assembly to side links.

Number 3 (Rear) Bow

Remove or Disconnect

1. Two bolts and washers securing number 3 (rear) bow assembly to number 2 (main) bow assembly.
2. Number 3 (rear) bow assembly from number 2 (main) bow assembly.
3. Rivets securing number 3 (rear) bow to pivot brackets.
4. Number 3 (rear) bow from pivot brackets.

Install or Connect

1. Number 3 (rear) bow to pivot brackets.
2. Rivets securing number 3 (rear) bow to pivot brackets.
3. Number 3 (rear) bow assembly to number 2 (main) bow assembly.
4. Two bolts and washers securing number 3 (rear) bow assembly to number 2 (main) bow assembly.

Stacking Assembly

Figures 7 and 14

Remove or Disconnect

- Lower folding top by disengaging velcro strap at number 3 (rear) bow, positioning rear side covers inward, and unlatching header at windshield.
1. End cap from quarter molding.
 2. Quarter molding by sliding it off of retainer.
 3. Three screws securing retainer and convertible top material.
 - Raise deck lid.
 4. Twelve screws securing folding top material to vehicle.

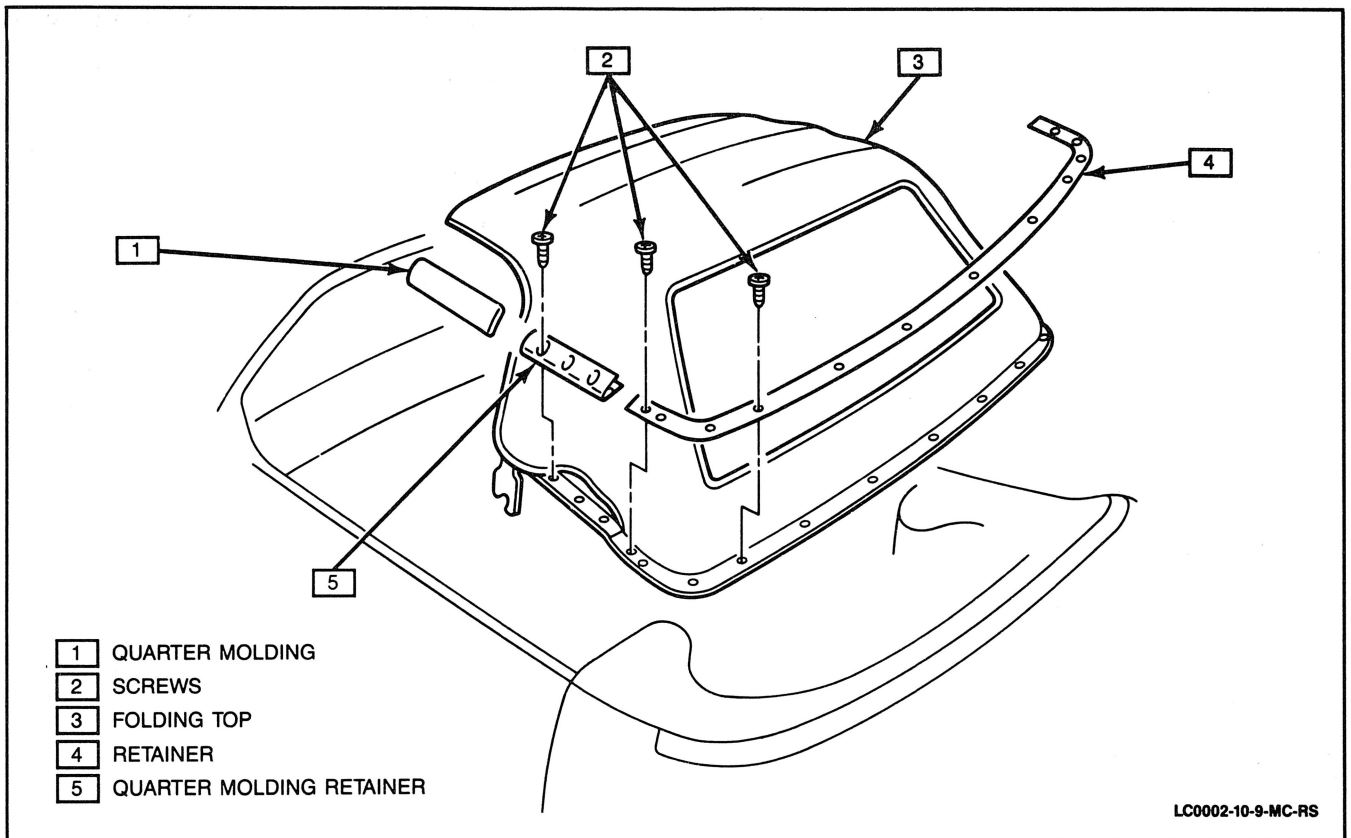


Figure 14 Folding Top Material

5. Three fasteners securing interior side trim to the vehicle.

- Position side trim aside.
6. Two upper folding top mounting bolts.
- Loosen two lower folding top mounting bolts.
7. Folding top assembly from vehicle.

Install or Connect

- Raise deck lid.
1. Folding top assembly to vehicle.
 2. Four folding top mounting bolts.

Tighten

- Folding top mounting bolts to 28 N·m (20 lb.ft.).
3. Side trim panels, secure with fasteners.
 4. Twelve screws securing folding top material to vehicle.

Tighten

- Folding top material screws to 4 N·m (24 lb.in.).
5. Three screws securing retainer and folding top material.
 6. Quarter molding to retainer.
 7. End cap to quarter molding.

Adjust

- Folding top by loosening the mounting bolts and pivoting top for proper alignment. The folding top weatherstrip should be flush with the glass surface. Tighten the fabric by moving the number 3 (rear) bow and securing it with the velcro strap.

UNIT REPAIR

FOLDING TOP

Figures 12 and 13

Remove or Disconnect

1. Folding top material. Refer to "Folding Top Cover and Backlite" earlier in this section.
2. Four bolts securing header.
3. Header from folding top assembly.
4. Six screws securing front seal to header.
5. Front seal from header.
6. One screw and handle from latch.
7. Two screws securing latch to header.
8. Four screws securing connecting rods to latch pivot bracket and latch locks.
9. Two screws securing latch locks to header.
10. Latch from header.
11. Bolts and washers securing number 1 (front) bow assembly to side links.

10-9-10 ROOF AND CONVERTIBLE TOP

12. Number 1 (front) bow assembly from side links.
13. Rivets securing number 1 (front) bow to pivot brackets.
14. Pivot brackets from number 1 (front) bow.
15. Bolts and washers securing side links to number 2 (main) bow assembly.
16. Side links from number 2 (main) bow assembly.
17. Two bolts and washers securing number 3 (rear) bow assembly to number 2 (main) bow assembly.
18. Number 3 (rear) bow assembly from number 2 (main) bow assembly.
19. Rivets securing number 3 (rear) bow to pivot brackets.
20. Pivot brackets from number 3 (rear) bow.
21. Four bolts and washers securing number 2 (main) bow to lower pivot bracket.
22. Number 2 (main) bow support arms from adjustment bracket.
23. Number 2 (main) bow lower pivot bracket from number 2 (main) bow.
24. Weatherstrips, screws and retainers from side links and number 2 (main) bow.

Install or Connect

1. Retainers, screws and weatherstrips to side links and number 2 (main) bow.
2. Lower pivot bracket to number 2 (main) bow.
3. Four bolts securing lower pivot brackets to number 2 (main) bow.

Tighten

- Lower pivot bracket-to-number 2 (main) bolts to 18 N·m (13 lb.ft.).
4. Number 2 (main) bow support arms to lower pivot bracket.
 5. Two bolts and washers securing number 2 (main) bow support arms to lower pivot brackets.

Tighten

- Number 2 (main) bow support arm bolts to 18 N·m (13 lb.ft.).

6. Pivot brackets to number 3 (rear) bow; secure with rivets.
7. Number 3 (rear) bow assembly to number 2 (main) bow assembly.
8. Two bolts and washers securing number 3 (rear) bow assembly to number 2 (main) bow assembly.

Tighten

- Bolts securing number 3 (rear) bow assembly to number 2 (main) bow assembly to 18 N·m (13 lb.ft.).
9. Side links to number 2 (main) bow assembly.
 10. Bolts and washers securing side links to number 2 (main) bow assembly.

Tighten

- Side links-to-number 2 (main) bow bolts to 18 N·m (13 lb.ft.).
11. Pivot brackets to number 1 (front) bow; secure with rivets.
 12. Number 1 (front) bow assembly to side links.
 13. Bolts and washers securing number 1 (front) bow assembly to side links.

Tighten

- Number 1 (front) bow assembly-to-side link bolts to 18 N·m (13 lb.ft.).
14. Latch to header; secure with 2 screws.
 15. Latch locks to header; secure with 2 screws.
 16. Connecting rods to latch pivot bracket and latch locks; secure with 4 screws.
 17. Handle to latch assembly; secure with 1 screw.
 18. Front seal to header and secure with 6 screws.
 19. Header to folding top assembly; secure with 4 bolts.

Tighten

- Header-to-folding top assembly bolts to 18 N·m (13 lb.ft.).
20. Folding top material. Refer to "Folding Top Cover and Backlite" earlier in this section.

SPECIFICATIONS

FASTENER TORQUES

Folding Top Mounting Bolts	28 N·m (20 lb.ft.)
Folding Top Material Screws	4 N·m (24 lb.in.)
Header-to-Folding Top Bolts	18 N·m (13 lb.ft.)
Lower Pivot Bracket-to-Number 2 (Main) Bow Bolts	18 N·m (13 lb.ft.)
Number 2 (Main) Bow Support Arm Bolts	18 N·m (13 lb.ft.)
Number 3 (Rear) Bow Assembly to Number 2 (Main) Bow Bolts ..	18 N·m (13 lb.ft.)
Side Links-to-Number 2 (Main) Bow Bolts	18 N·m (13 lb.ft.)
Number 1 (Front) Bow Assembly-to-Side Link Bolts	18 N·m (13 lb.ft.)

SECTION 10-10

SEATS

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

CAUTION: Replace belts, retractors and hardware in use during all but a minor collision. Also, restraint systems should be replaced and anchorages properly repaired if they were in areas of damage by a collision, whether the belt was in use or not. If there is any question, replace the belt system. Damage, whether visible or not, could result in serious personal injury in the event of an accident.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

SEATS

This vehicle is equipped with low-backed bucket seats and separate head restraints. Seat cushions and backs have formed foam pads, which fit the contours of the full panel seat back frame assembly and also the designed contour of the seat cushion frame. For access to the rear cargo area, the front seat backs move forward by use of the recliner lever. The recliner lever is an integral part of the recliner mechanism and is mounted on the outboard side of the seat.

There are no front seat forward or rearward relocation provisions provided at either seat adjuster-to-floor pan attachments or seat adjuster-to-seat frame attachments.

NOTICE: Do not attempt to change the seat position by altering the designed seat adjuster-to-floor pan anchor provisions or seat adjuster-to-seat frame anchor provisions. This adjustment could affect the performance of the seat system.

ON-VEHICLE SERVICE

FRONT SEAT

Figure 1



Remove or Disconnect

1. Five seat rail mounting bolts.
2. Front seat from vehicle.



Install or Connect

1. Front seat to vehicle.
2. Five bolts securing front seat.



Tighten

- Front seat mounting bolts to 18 N·m (13 lb.ft.).

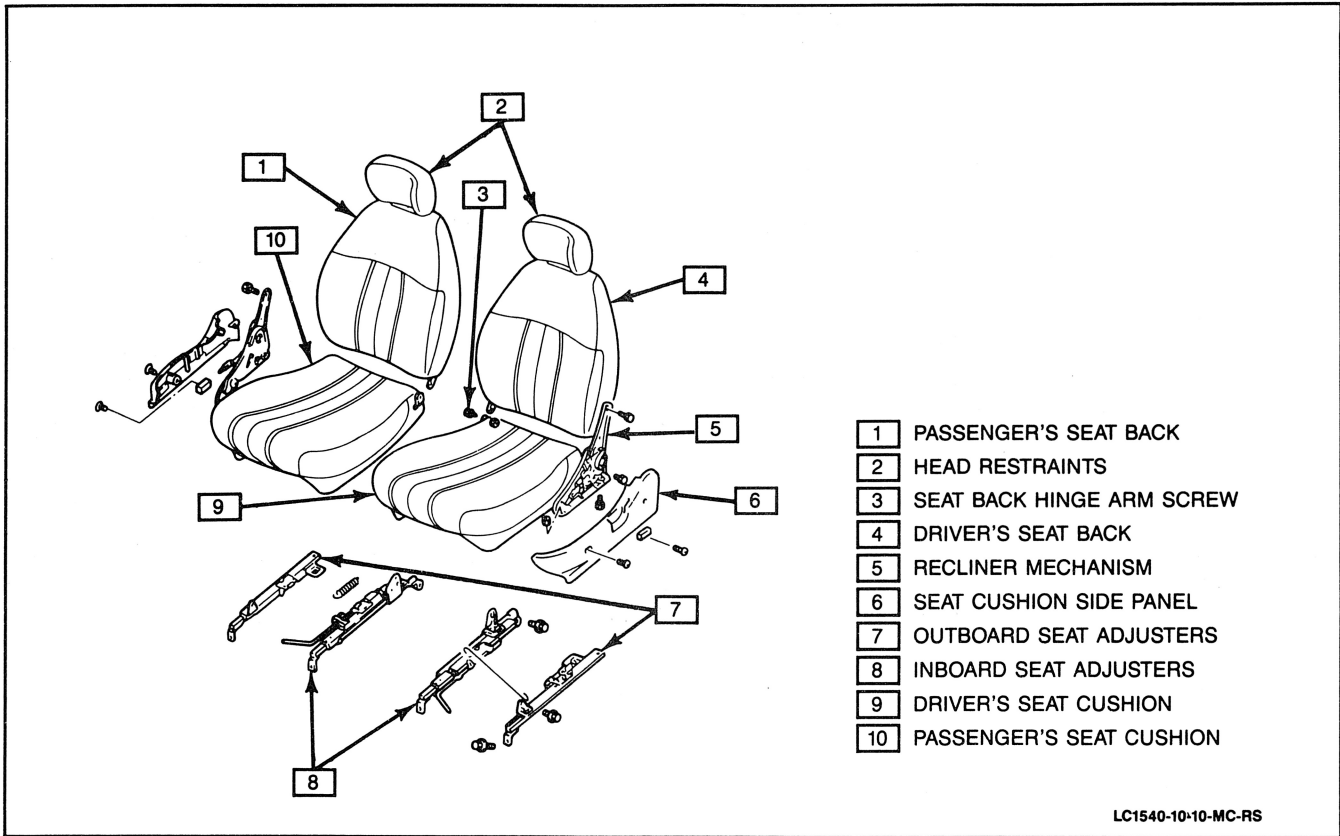


Figure 1 Front Seat Assembly

Trim and Covers

Seat Back

Remove or Disconnect

- Five hog rings from lower perimeter of front seat back.
 - Roll cover up, slowly and evenly, from seat bottom.
- Head restraint spring retainer.
- Head restraint from seat back.
- Cover from seat back.

Install or Connect

- Cover to seat back.
- Head restraint to seat back; secure with spring retainer.
 - Roll cover down from seat top.
- Five hog rings to lower perimeter of seat back.

Seat Cushion

Figure 1

Remove or Disconnect

- Five bolts and seat from vehicle.
- Seat adjusters. Refer to "Seat Adjusters" later in this section.
- Inboard seat back hinge arm screw.

- Hog rings and seat cushion cover. The top of the cover is bonded to the seat's foam pad—use care in removing the cover.

Install or Connect

- Seat cushion cover to seat cushion; bond cover to top of cushion using trim cement.
- Hog rings securing seat cushion cover.
- Inboard seat back hinge arm screw.
- Seat adjusters. Refer to "Seat Adjusters" later in this section.
- Seat assembly to vehicle; secure with 5 bolts.

Tighten

- Front seat mounting bolts to 18 N·m (13 lb.ft.).

Head Restraint

Remove or Disconnect

- Five hog rings from lower perimeter of front seat back.
 - Roll cover up, slowly and evenly, from seat bottom to gain access to head restraint retainer.
- Head restraint spring retainer.
- Head restraint from seat back.

Install or Connect

- Head restraint to seat back; secure with spring retainer.

- Roll cover down from seat top.
2. Five hog rings to lower perimeter of seat back.

Recliners

Figure 1

 Remove or Disconnect

1. One screw and recliner handle from seat.
2. Two screws and seat cushion side panel from seat.
 - Loosen seat back cover to gain access to 2 mounting screws.
3. Five bolts retaining recliner assembly; 2 from the seat back and 3 from the seat cushion.
4. Recliner assembly from seat.

 Install or Connect

1. Recliner assembly to seat, securing with 5 bolts; 3 to the seat cushion and 2 to the seat back.

 Tighten

- Recliner assembly mounting bolts to 18 N·m (13 lb.ft.).
- Reposition seat back cover and install hog rings.
2. Seat cushion side panel to seat; secure with 2 screws.
 3. Recliner handle to seat, securing with 1 screw.

Seat Adjusters

Figure 1

 Remove or Disconnect

1. Five bolts and seat from vehicle.
2. One screw and recliner handle from seat.
3. Two screws and seat cushion side panel from seat.
4. Two bolts and 1 nut retaining outboard seat adjuster.
5. Two bolts retaining inboard seat adjuster.
6. Seat adjusters from seat.
7. Safety belt buckle from inboard seat adjuster (if required).

 Install or Connect

1. Safety belt buckle to inboard seat adjuster (if removed).
2. Seat adjusters to seat.
3. Two bolts securing inboard seat adjuster to seat.
4. Two bolts and 1 nut securing outboard seat adjuster to seat.

 Tighten

- Seat adjuster mounting nut and bolts to 18 N·m (13 lb.ft.).
5. Seat cushion side panel to seat; secure with 2 screws.
 6. Recliner handle to seat, securing with 1 screw.
 7. Seat into vehicle; secure with 5 bolts.

 Tighten

- Seat mounting bolts to 18 N·m (13 lb.ft.).

SPECIFICATIONS

FASTENER TORQUES

Front Seat Mounting Bolts.....	18 N·m (13 lb.ft.)
Recliner Assembly Mounting Bolts	18 N·m (13 lb.ft.)
Seat Adjuster Mounting Nut and Bolts.....	18 N·m (13 lb.ft.)

SECTION 10-11

SAFETY BELTS

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in Section 9J under ON-VEHICLE SERVICE before performing service on or around SIR components or SIR wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

CAUTION: Replace belts, retractors and hardware that was in use during all but a minor collision. Also, restraint systems should be replaced and anchorages properly repaired if they were in areas of damage by a collision, whether the belt was in use or not. If there is any question, replace the belt system. Damage, whether visible or not, could result in serious personal injury in the event of an accident.

In convertibles, the front seat lap-shoulder belt has a small loop of webbing lightly stitched into the belt under the sleeve next to the door sill. Within this loop is a "Replace Belt" label that is normally not visible. If the loop has been pulled out for any reason (making the "Replace Belt" label visible), the belt must be replaced to help restore optimum restraint system effectiveness in accidents. To determine if the loop has been pulled out, inspect the webbing between the lap-shoulder belt latch plate and sleeve.

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque values must be used when installing fasteners that require them. If the above procedures are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

ACTIVE THREE POINT SAFETY BELT SYSTEM

Each safety belt system (driver and passenger) consists of one belt, a retractor mechanism, a shoulder belt guide loop, a buckle and a latch. The two lap support points are secured to the vehicle by anchor bolts at the lap belt bolt (outboard) and at the latch (inboard). The shoulder support point is secured to the vehicle at the safety belt tower by the shoulder belt guide loop.

The driver's-side safety belt incorporates an Emergency Locking Retractor (ELR), which is designed to lock the safety belt webbing in place during emergency vehicle maneuvers. During all normal driving conditions, however, the safety belt is free to unwind to its full length. While the safety belt is free to unwind, the driver is provided with more than sufficient freedom of movement to operate all vehicle controls and accessories. The driver's-side safety belt does not incorporate a comfort lock.

The passenger's-side safety belt incorporates an Emergency-Auto Locking Retractor (E-ALR). This type of retractor is identical in operation to the ELR until the safety belt is pulled out to its full length. Once

the safety belt has been pulled completely out of the retractor, the E-ALR automatically locks the webbing into any position to which the belt is allowed to retract. Once the E-ALR function has been initiated (by pulling the belt all the way out), the belt can only be unlocked by allowing the webbing to be completely wound back into the retractor. After the safety belt has been unlocked, it can be pulled out normally and the E-ALR again operates identically to the ELR (unless the belt is again pulled all the way out). The passenger's-side safety belt does not incorporate a comfort lock.

Important

- Keep sharp and potentially damaging objects away from belts.
- Avoid bending or damaging any portion of the buckle or latch.
- Do not bleach or dye belt webbing (use only mild soap and water).
- When installing safety belt anchor bolts, start bolts by hand to prevent cross-threading.
- Do not attempt any repairs on retractor mechanisms or covers.

10-11-2 SAFETY BELTS

- Replace defective assemblies with new ones.
- Replace any belts that are cut or damaged in any way.
- Do not install anything in trim panel which will obstruct the movement of the safety belt.

ON-VEHICLE SERVICE

OPERATIONAL AND FUNCTIONAL CHECKS



Inspect

- All safety belt anchorage bolts to verify that they are secure.
- Safety latch buckle, making sure it locks and unlocks easily.
- After inserting buckle into latch, tug sharply on belt, checking that the latch remains locked.
- Fully extend shoulder belt to make sure there are no twists or tears in it.
- Allow the shoulder belt to fully retract to make sure it does so easily.

Running Test (E-ALR Safety Belts)

1. Fasten safety belt.
2. Drive vehicle at 16 km/h (10 mph) and apply brakes firmly.
3. Verify that the safety belt locks and does not allow your body to move forward.

CAUTION: Conduct this test only in a safe area. Do not conduct this test on the open road. A large empty parking lot is much more suitable.

4. If the belt does not lock during the running test, remove retractor and perform the static test.

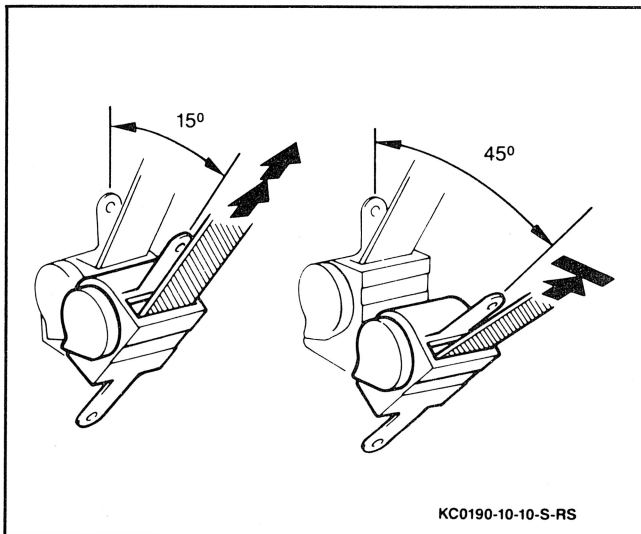


Figure 1 Static Test

Static Test

Figure 1

1. Remove retractor assembly.
2. Tilt the retractor slowly.

3. Verify that the belt can be pulled out of the retractor at an inclination of 15 degrees or less and that it cannot be pulled out at over 45 degrees of inclination.
4. If a problem is found, replace the retractor mechanism.

SAFETY BELT ASSEMBLY

Figure 2



Remove or Disconnect

1. Battery negative (-) cable.
2. One bolt securing safety belt latch to seat adjuster.
3. Safety belt latch electrical connector.
4. Safety belt latch from vehicle.
5. One bolt securing lap belt to vehicle floor.
6. Six screws and 3 fasteners securing rear speaker trim panel.
7. Rear speaker trim panel from vehicle.
8. Three fasteners securing passenger compartment quarter trim panel.
9. Passenger compartment quarter trim panel from vehicle.
10. One bolt and 1 screw securing safety belt retractor assembly to vehicle.
11. Safety belt retractor assembly from vehicle.
12. One bolt securing shoulder belt guide loop to vehicle.
13. Shoulder belt guide loop from vehicle.



Install or Connect

1. Shoulder belt guide loop to vehicle with bolt.



Tighten

- Shoulder belt guide loop bolt to 45 N·m (33 lb.ft.).
2. Safety belt retractor assembly to vehicle with screw and bolt.



Tighten

- Safety belt retractor assembly mounting bolt to 45 N·m (33 lb.ft.).
3. Passenger compartment quarter trim panel to vehicle with 3 fasteners.
 4. Rear speaker trim panel to vehicle with 6 screws and 3 fasteners.
 5. Lap belt to vehicle floor with lap belt bolt.



Tighten

- Lap belt anchor bolt to 45 N·m (33 lb.ft.).
6. Safety belt latch to seat adjuster with safety belt latch bolt.
 7. Safety belt latch electrical connector.

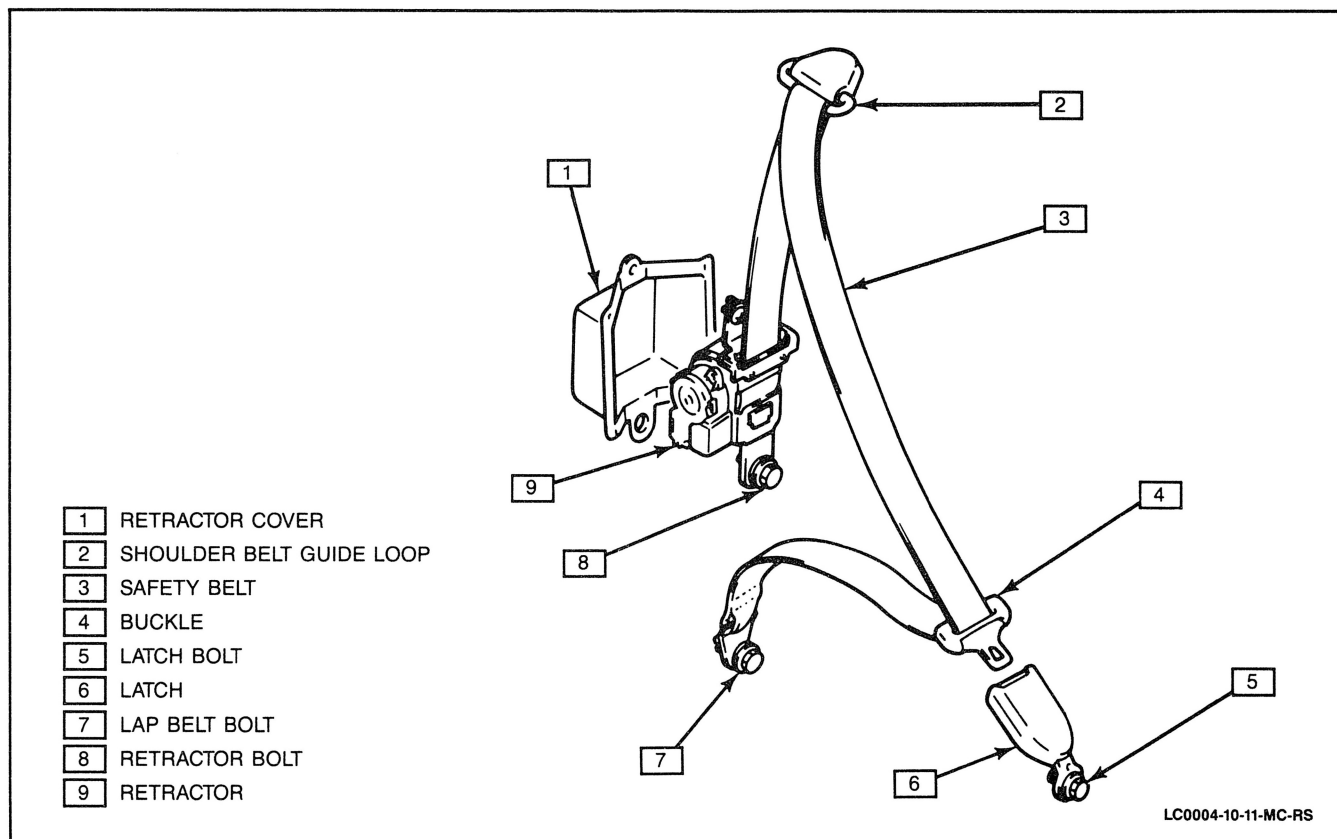


Figure 2 Active 3 Point Safety Belt System

**Tighten**

- Safety belt latch bolt to 45 N·m (33 lb.ft.).

8. Battery negative (-) cable.

SPECIFICATIONS

FASTENER TORQUES

Safety Belt Retractor Assembly Mounting Bolt	45 N·m (33 lb.ft.)
Shoulder Belt Guide Loop Bolt	45 N·m (33 lb.ft.)
Lap Belt Anchor Bolt.....	45 N·m (33 lb.ft.)
Safety Belt Latch Bolt	45 N·m (33 lb.ft.)

SECTION 10-12

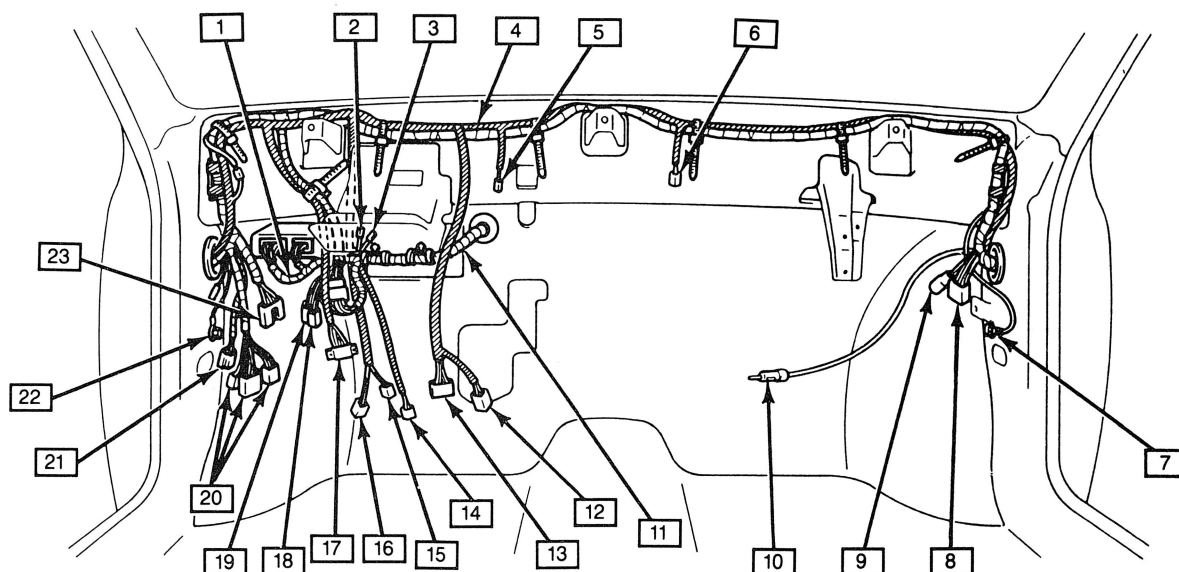
BODY WIRING

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to **CAUTIONS** in Section 9J under **ON-VEHICLE SERVICE** before performing service on or around SIR components or SIR wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury or unneeded SIR system repairs.

NOTICE: Whenever it becomes necessary to perform procedures not included in this section, refer to the 1990 Geo Metro Service Manual.

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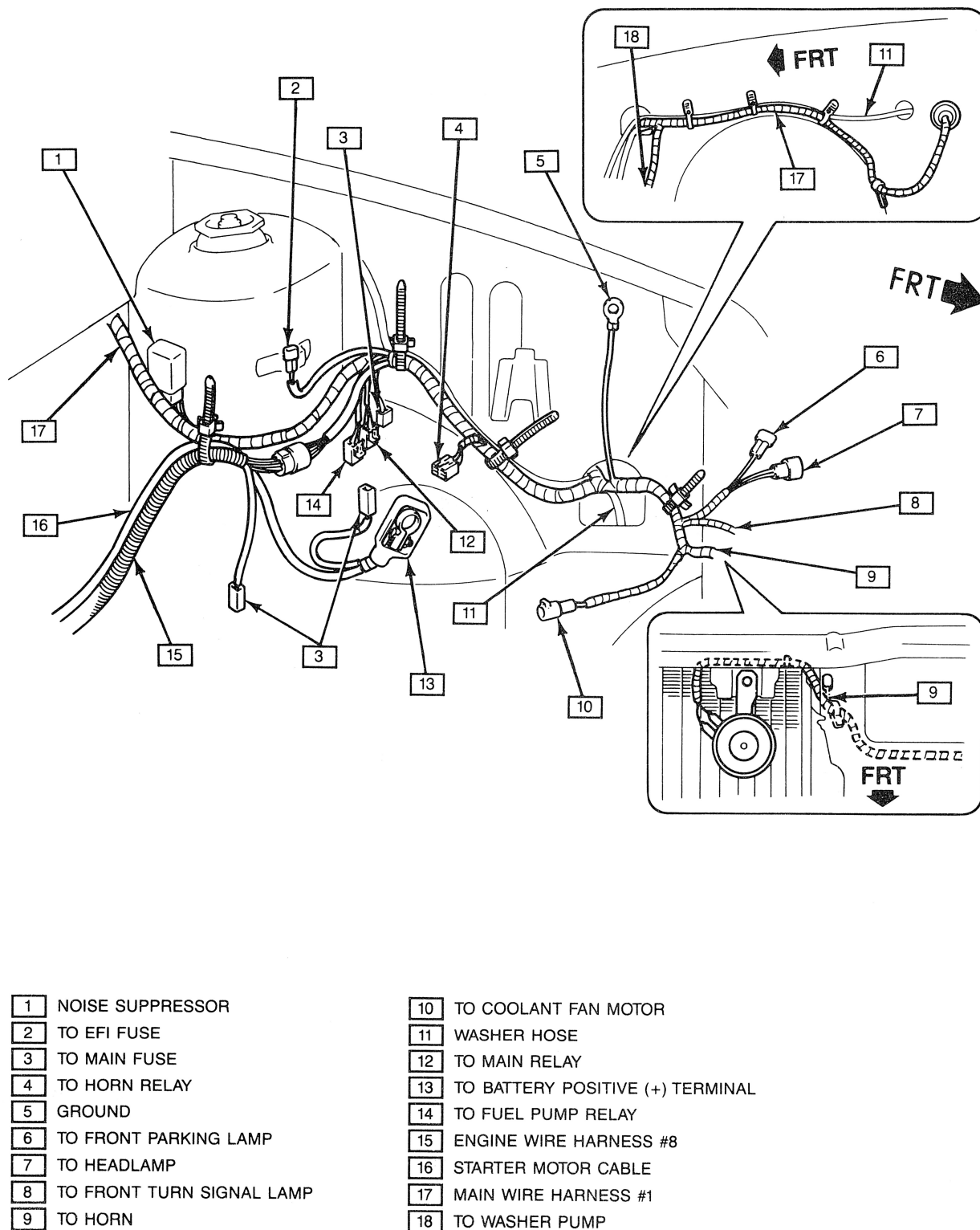
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- | | |
|---|--|
| 1 TO ENGINE CONTROL MODULE | 12 TO RESISTOR MODULE |
| 2 MONITOR COUPLER FOR TRANSAXLE CONTROL MODULE | 13 TO DERM |
| 3 DIAGNOSIS SWITCH COUPLER FOR TRANSAXLE CONTROLLER | 14 TO TRANSAXLE CONTROL MODULE |
| 4 MAIN WIRE HARNESS #1 | 15 TO SIR COIL |
| 5 TO PASSENGER COMPARTMENT DISCRIMINATING SENSOR | 16 TO IGNITION SWITCH |
| 6 TO ARMIMG SENSOR | 17 ALDL CONNECTOR |
| 7 GROUND | 18 TO STOPLAMP SWITCH |
| 8 TO A/C WIRE HARNESS (OPTIONAL) | 19 TO CLUTCH START SWITCH (MANUAL TRANSAXLE) |
| 9 TO DOME LAMP | 20 TO FUSE BLOCK |
| 10 TO RADIO | 21 TO FLOOR HARNESS #3 |
| 11 ENGINE WIRE HARNESS #5 | 22 GROUND |
| | 23 TO I/P HARNESS #2 |

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Figure 1 Upper Cowl Wiring



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Figure 2 Left-Side Fender Apron Wiring

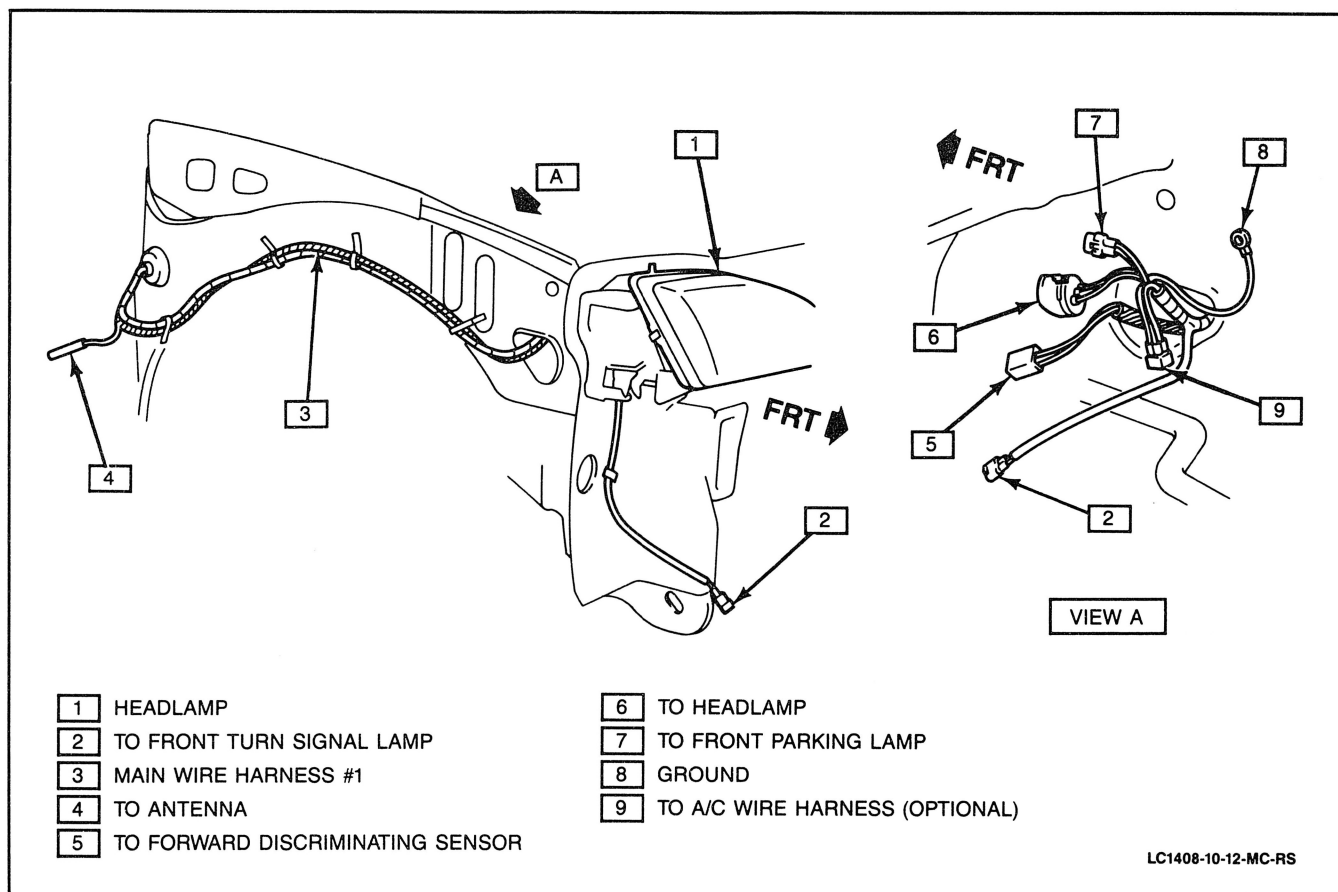


Figure 3 Right-Side Inner Fender Wiring

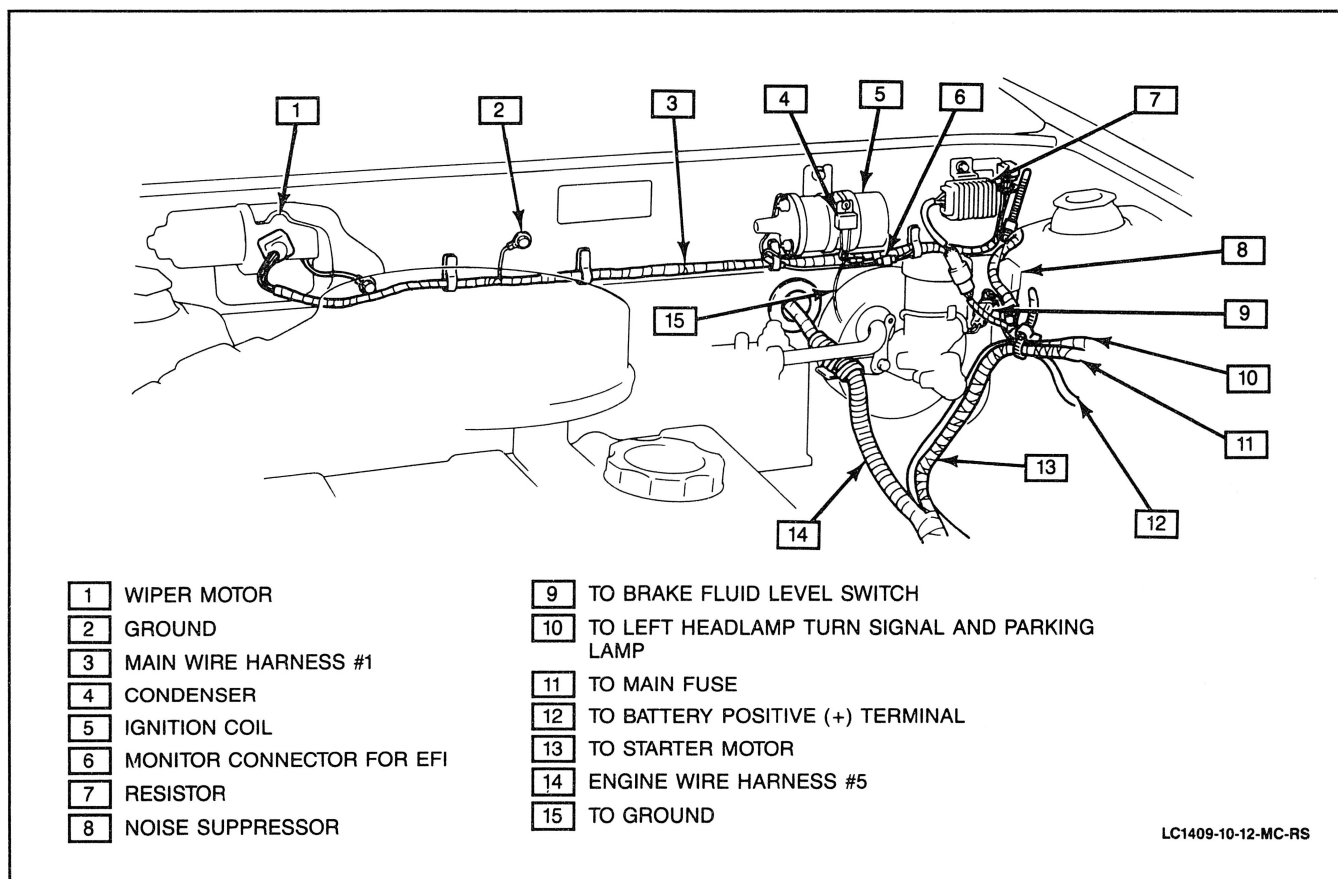
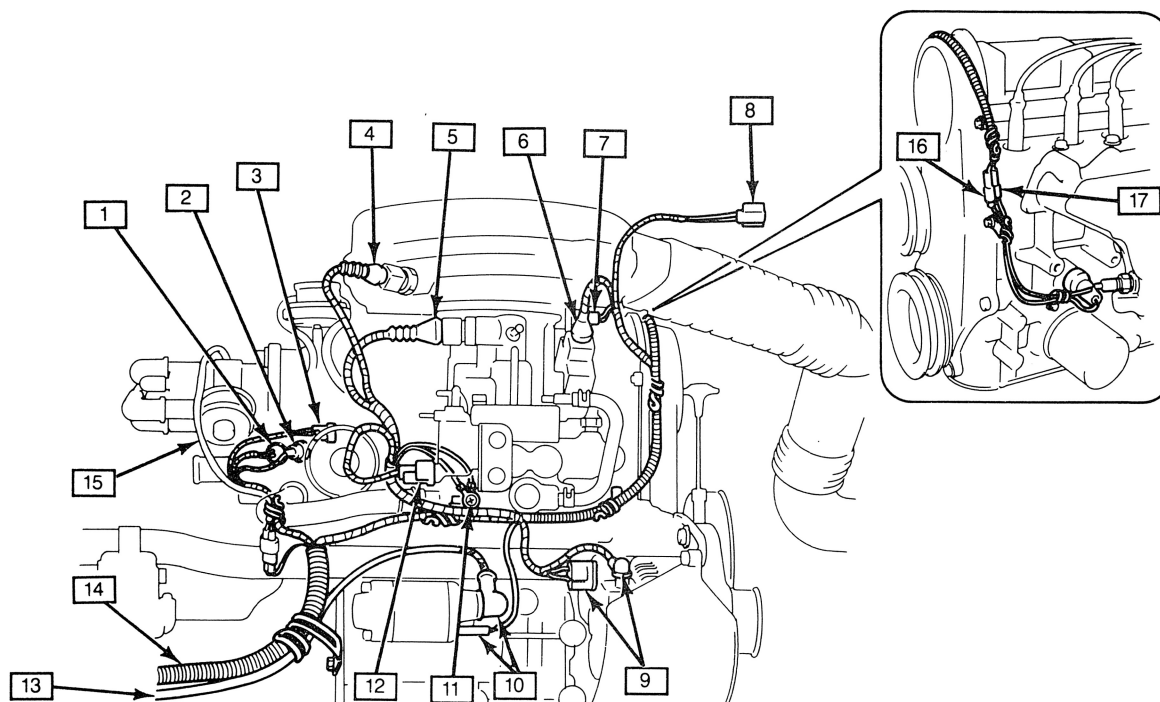


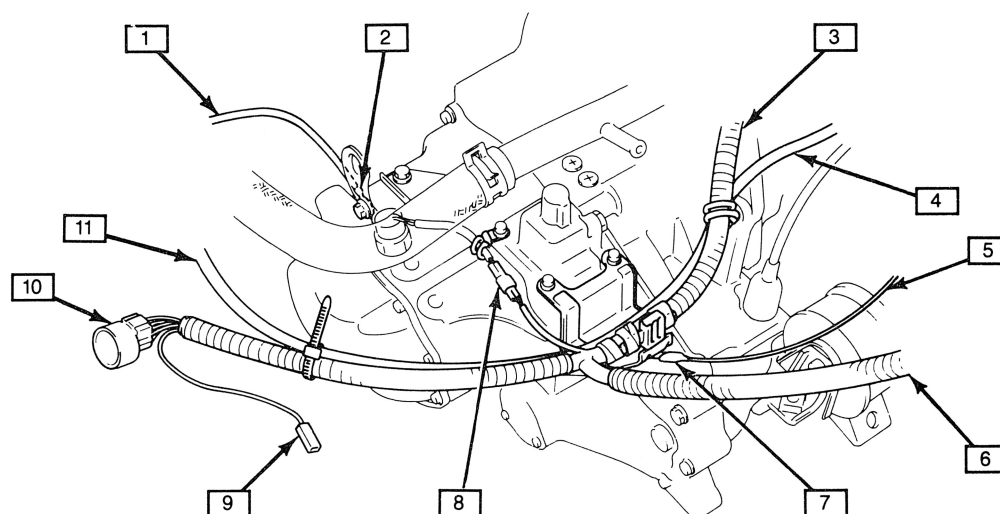
Figure 4 Cowl Top Panel Wiring



- | | |
|---|---|
| 1 RADIATOR COOLING FAN MOTOR SWITCH | 8 MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR |
| 2 COOLANT TEMPERATURE GAGE SENDING UNIT | 9 GENERATOR CONNECTIONS |
| 3 EXHAUST GAS RECIRCULATION VACUUM SWITCHING VALVE | 10 STARTER MOTOR CONNECTIONS |
| 4 AIR TEMPERATURE SENSOR | 11 GROUND CONNECTION |
| 5 COOLANT TEMPERATURE SENSOR | 12 IDLE SPEED CONTROL SOLENOID VALVE |
| 6 THROTTLE POSITION SWITCH (MANUAL TRANSAXLE VEHICLES)
THROTTLE POSITION SENSOR (AUTOMATIC TRANSAXLE VEHICLES) | 13 BATTERY POSITIVE (+) TERMINAL |
| 7 FUEL INJECTOR | 14 ENGINE WIRING HARNESS |
| | 15 DISTRIBUTOR WIRING |
| | 16 OXYGEN SENSOR CONNECTOR |
| | 17 OIL PRESSURE SWITCH CONNECTOR |

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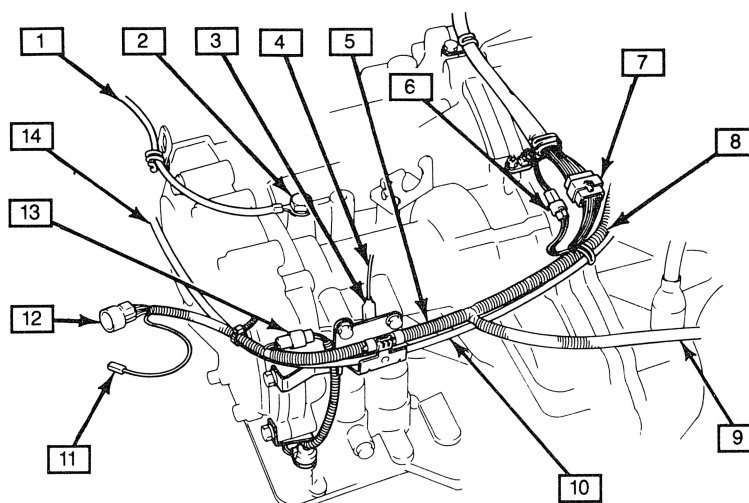
Figure 5 Engine Wiring



- | | |
|------------------------------------|-------------------------------------|
| 1 TO BATTERY NEGATIVE (-) TERMINAL | 7 GROUND |
| 2 BATTERY GROUND | 8 TO BACKUP LAMP SWITCH |
| 3 ENGINE WIRE HARNESS #5 | 9 TO MAIN FUSE |
| 4 STARTER MOTOR CABLE | 10 TO MAIN WIRE HARNESS #1 |
| 5 TO CONDENSER | 11 TO BATTERY POSITIVE (+) TERMINAL |
| 6 TO ENGINE CONTROL MODULE | |

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Figure 6 Manual Transaxle Wiring



- | | |
|---|---|
| 1 TO BATTERY NEGATIVE (-) TERMINAL | 8 TO STARTER MOTOR |
| 2 BATTERY GROUND | 9 TO ENGINE CONTROL MODULE AND TRANSAXLE CONTROL MODULE |
| 3 GROUND | 10 STARTER MOTOR CABLE |
| 4 TO CONDENSER | 11 TO MAIN FUSE |
| 5 ENGINE WIRE HARNESS #5 | 12 TO MAIN WIRE HARNESS #1 |
| 6 TO SPEED SENSOR | 13 TO TRANSAXLE SHIFT SOLENOID |
| 7 TO SHIFT LEVER BACKUP AND NEUTRAL SAFETY SWITCH | 14 TO BATTERY POSITIVE (+) TERMINAL |

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Figure 7 Automatic Transaxle Wiring

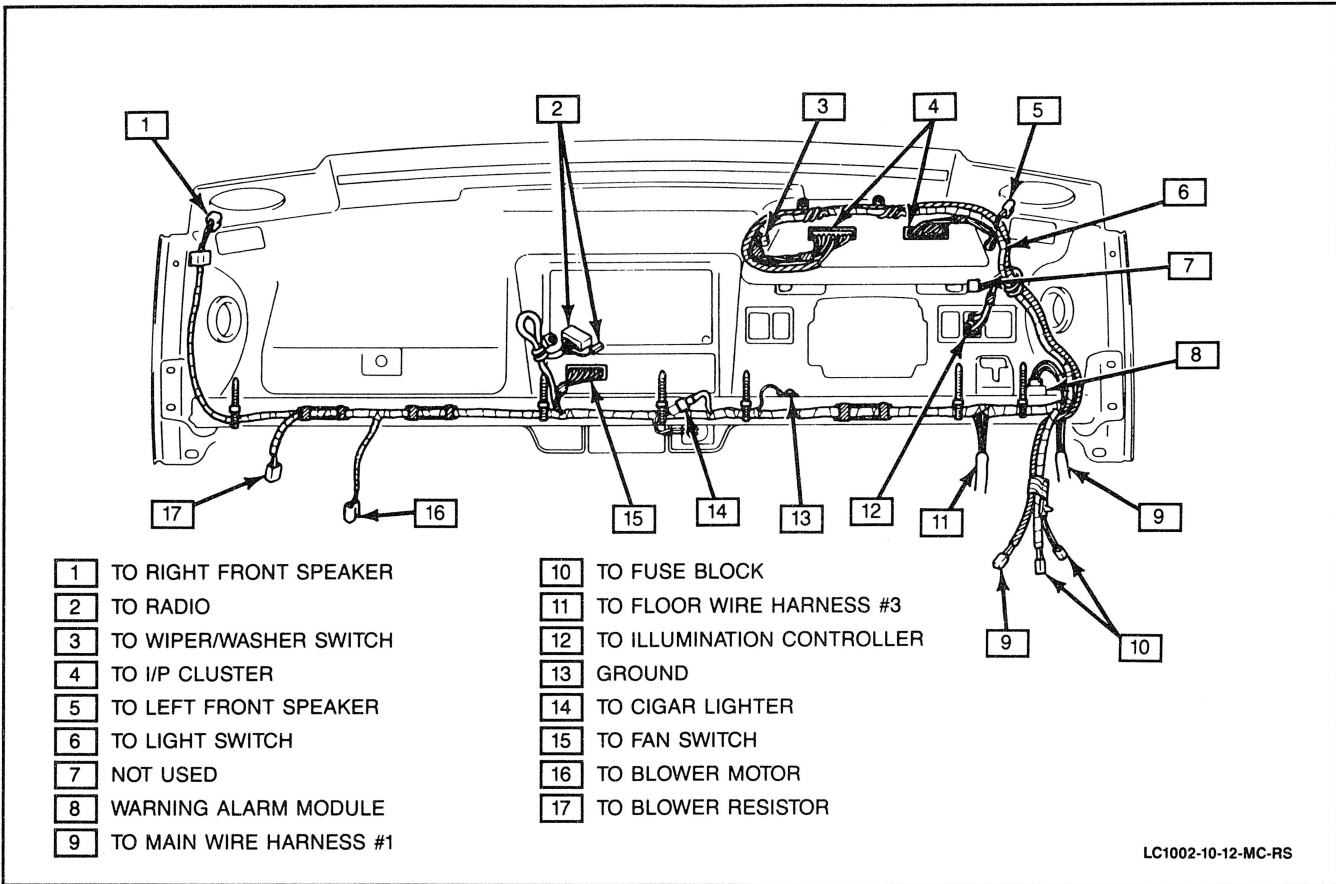


Figure 8 Instrument Panel Wiring (USA)

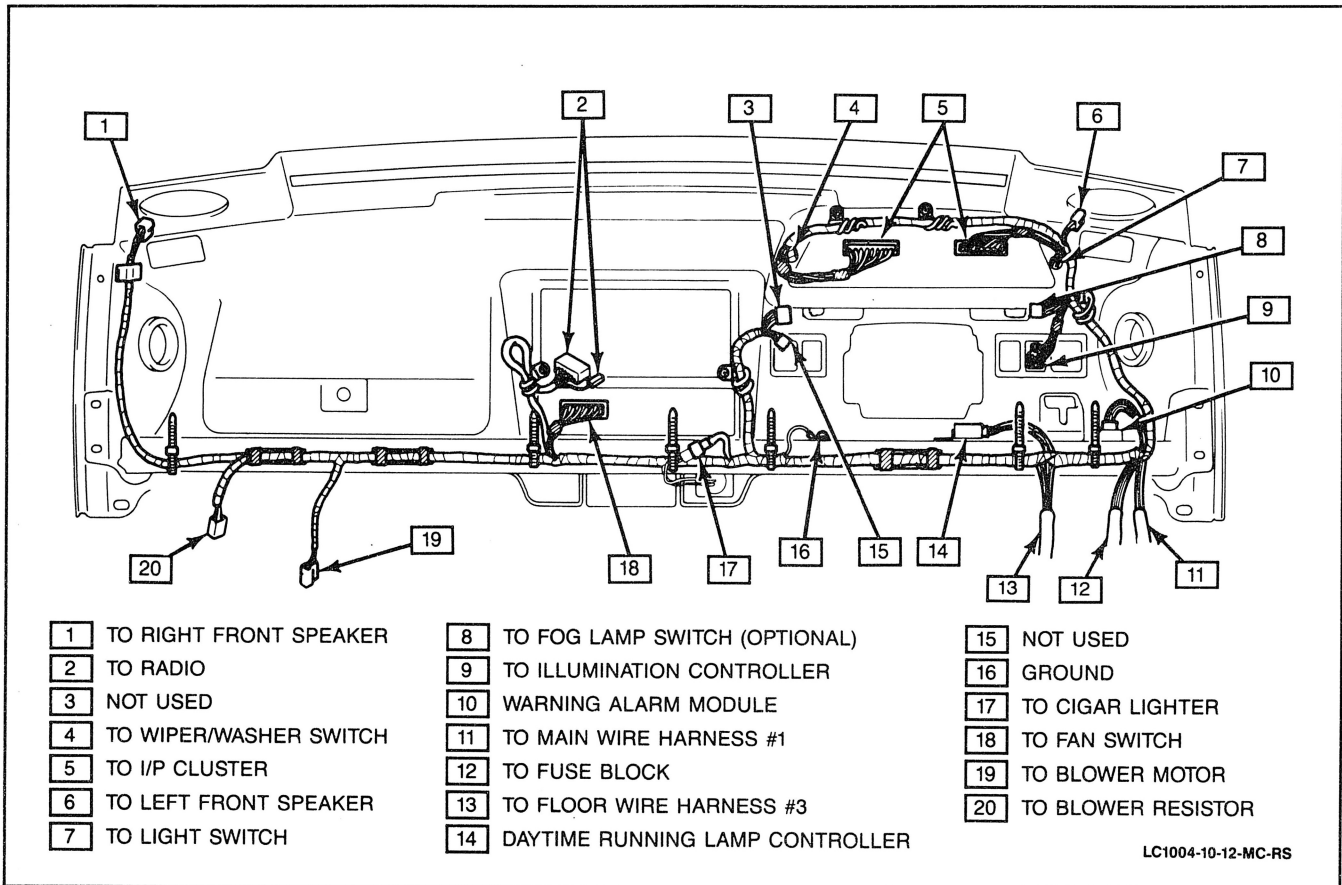
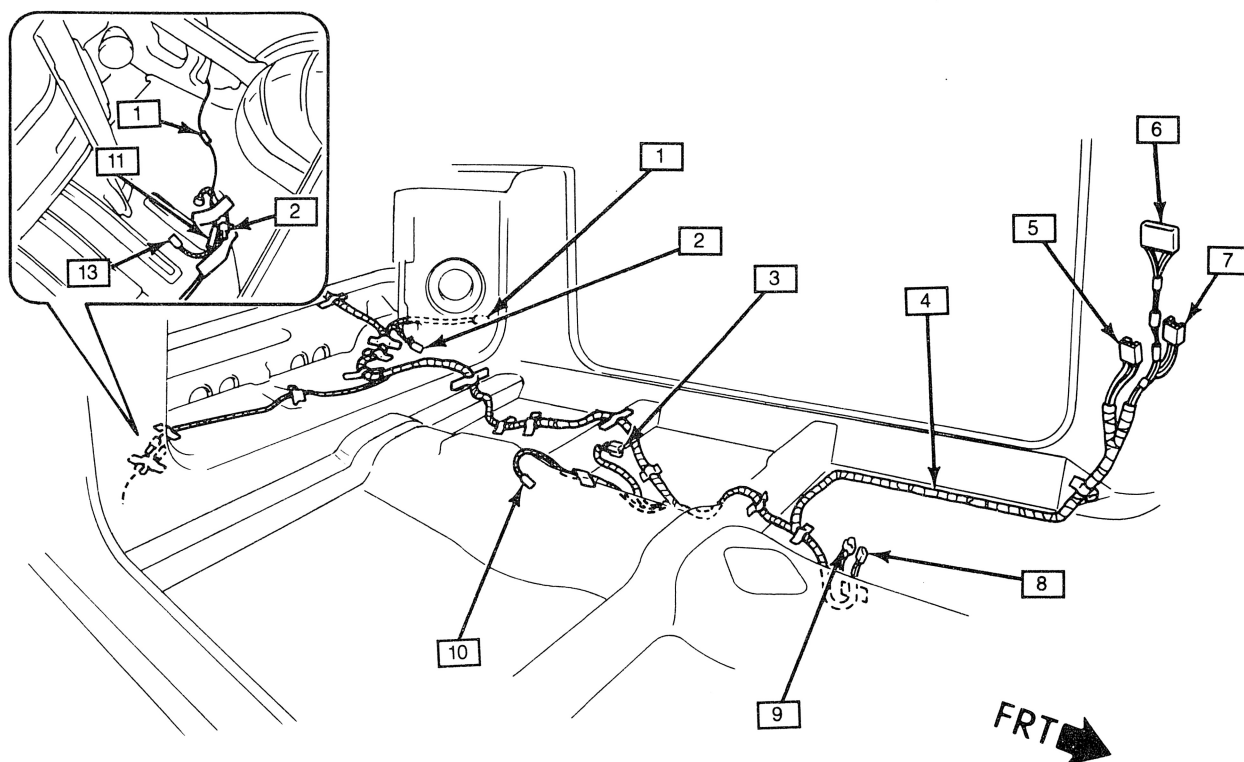


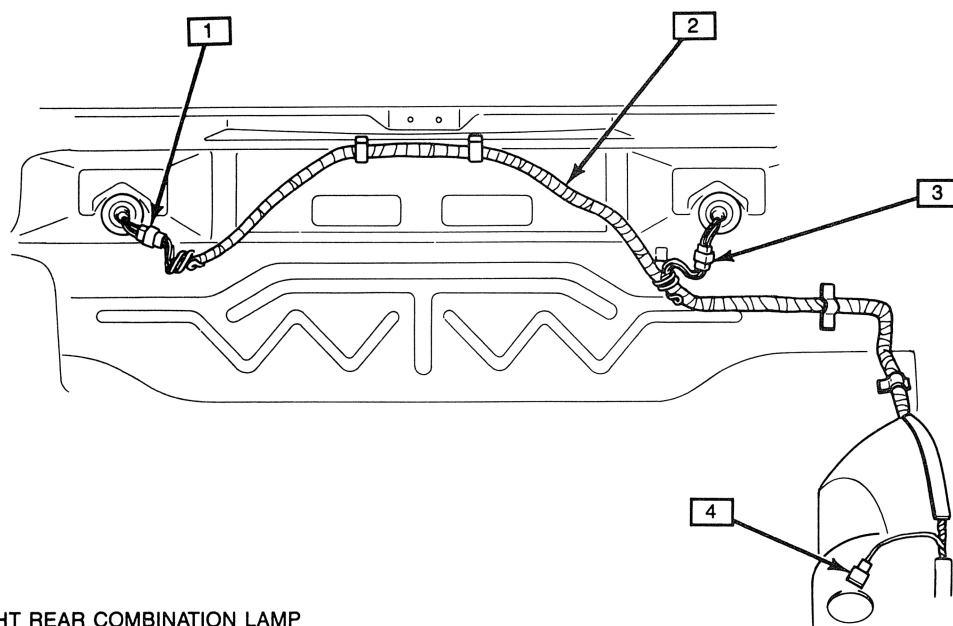
Figure 9 Instrument Panel Wiring (Canada)



- 1 TO DOOR SWITCH
- 2 TO LEFT REAR SPEAKER
- 3 TO SAFETY BELT SWITCH
- 4 FLOOR WIRE HARNESS #3
- 5 TO MAIN WIRE HARNESS #1
- 6 TO I/P WIRE HARNESS #2
- 7 TO FUSE BLOCK
- 8 TO GEAR SELECTOR ILLUMINATION
- 9 TO BRAKE TRANSAXLE SHIFT INTERLOCK SOLENOID
- 10 TO PARKING BRAKE SWITCH
- 11 TO FUEL GAGE SENDING UNIT
- 12 TO FUEL PUMP
- 13 TO RIGHT REAR SPEAKER

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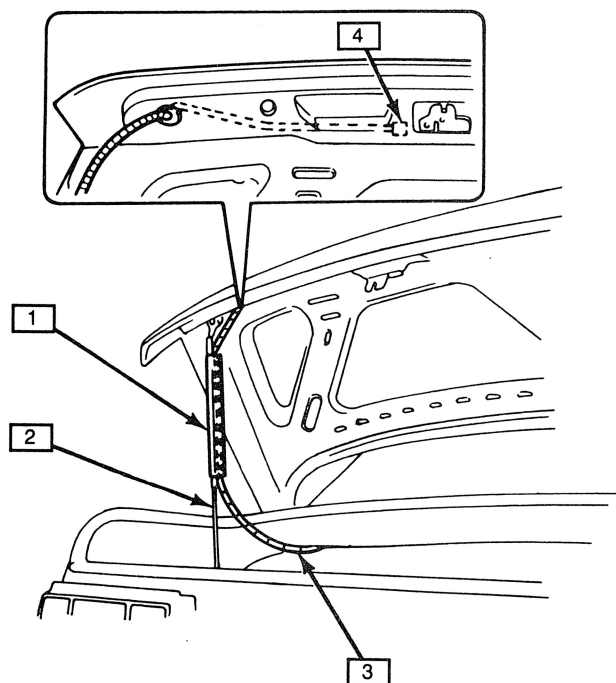
Figure 10 Floor Wiring



- 1 TO RIGHT REAR COMBINATION LAMP
- 2 FLOOR WIRE HARNESS #3
- 3 TO LEFT REAR COMBINATION LAMP
- 4 TO CENTER HIGH-MOUNTED STOPLAMP

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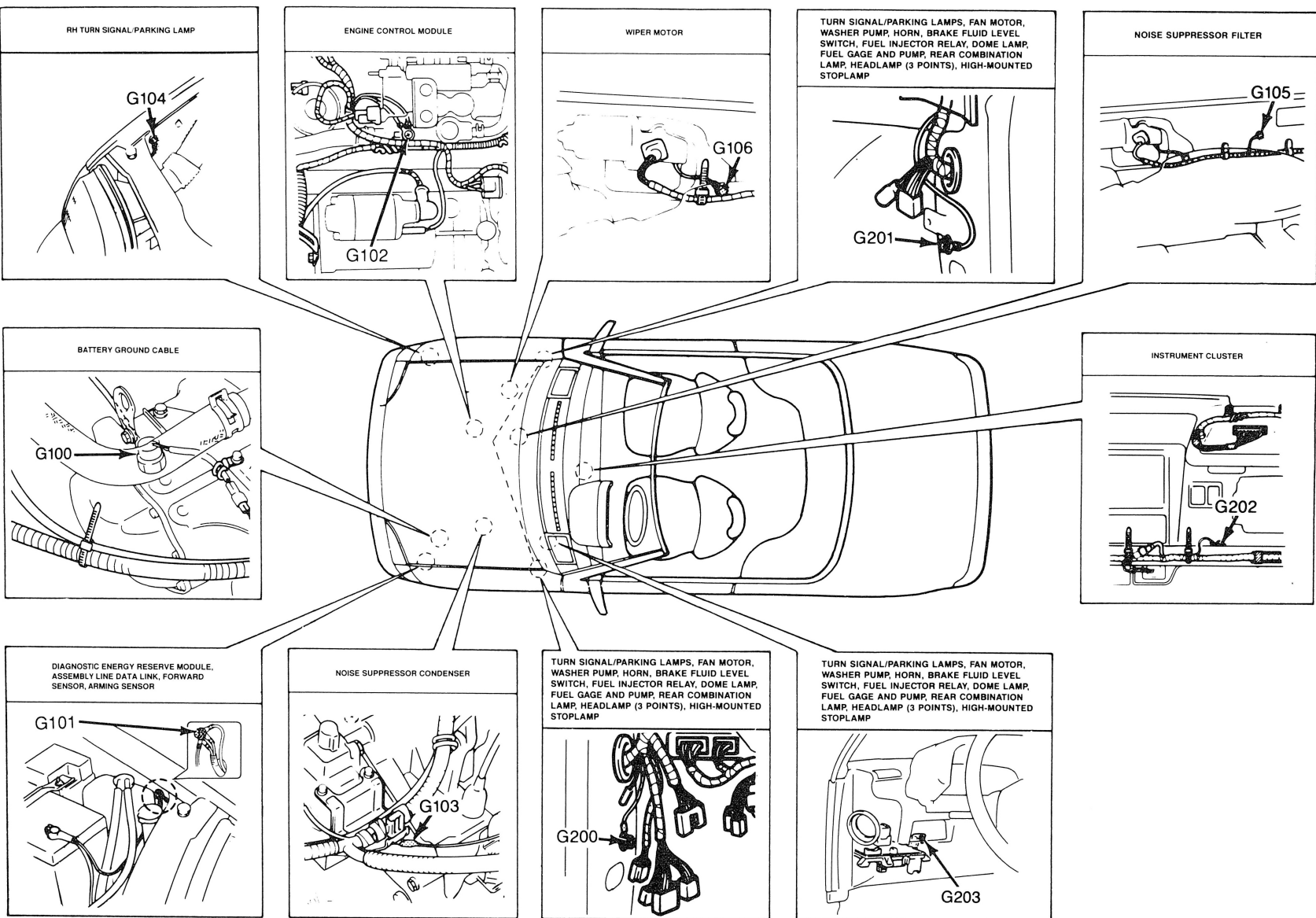
Figure 11 Rear Body Wiring



- 1 TAPE
- 2 DECK LID SUPPORT
- 3 DECK LID LEAD WIRE
- 4 TO CENTER HIGH-MOUNTED STOPLAMP

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Figure 12 Deck Lid Wiring



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Figure 13 Grounding Points

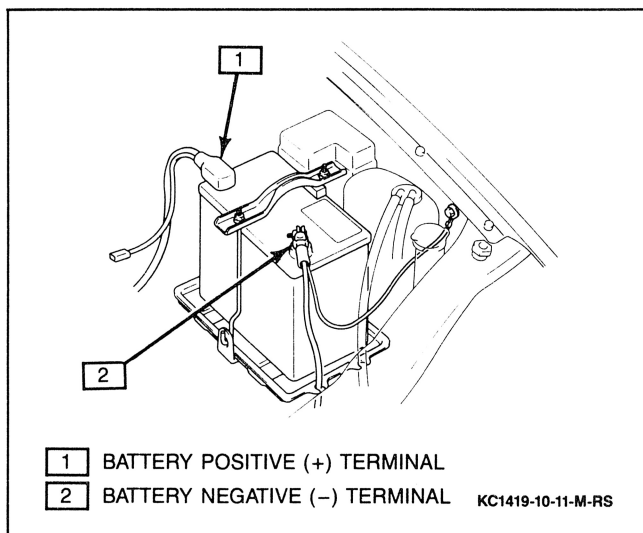


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